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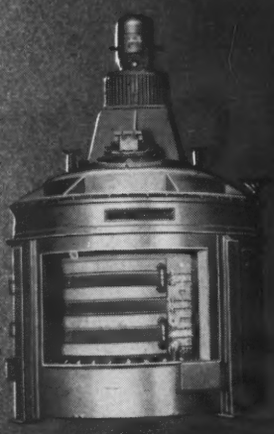

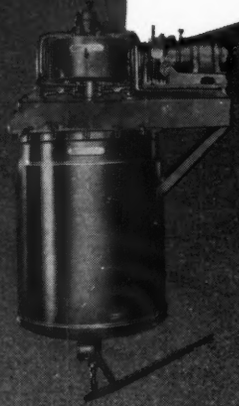

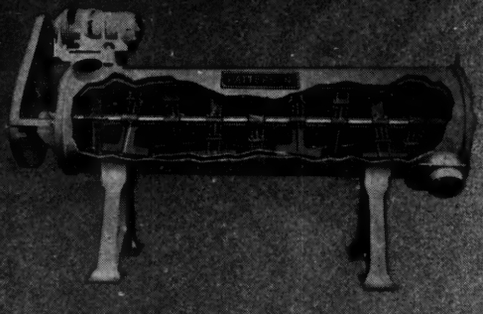

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TECHNOLOGY

VITAMINS
Carotene Loss 197
FATS AND OILS
Non-break Soybean Oil.....197
MEATS
Vitamin Retention in Processed Meats....197
RAW MATERIALS
Potato Yields 197
ASSAY METHODS
New Assay for Vitamin C.....197
STORAGE
Storage of Dried Fruits.....198
Color Changes in Eggs.....198
DAIRY
Irradiation of Milk.....200
Bacteria, Fat and Vitamins in Goats Milk.200
Continuous Butter Making Successful in Wartime Germany 75
MICROBIOLOGY
Salmonella in Dried Eggs.....202
FISH
Control of Rancidity in Stored Fish.....202
BAKING
Soy Flour in Baking.....206
High Frequency Heating Produces Mold-Free Bread 98
DEHYDRATION
Drying Whole Milk.....208
Dehydrating Meat 208
MISCELLANEOUS
pH Tolerance of Bacteria.....210
QUALITY CONTROL
New Consistometer Measures Corn Consistency 78
What Constitutes an Adequate Sample?.. 83
SANITATION
Using DDT for Fly Control..... 94
CANNING
Freezing Point Data Sheets and Cooling Curves—Part II 100
FROZEN FOODS
Quality Grades Are Essential for Frozen Food Packs.....108

THE COVER

Seasonal salmon canning calls for speedy, efficient operations from the time fish are caught until the labeled cans go into the cartons. For more pictures of work at a Libby canning plant, see page 90.

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VOLUME 18, NUMBER 6

JUNE, 1946

SPECIAL FEATURES
Food Muddle Grows Worse.....*By L. V. Burton* 71
What Do We Want From Germany..*By Priscilla A. Deutsch* 81
MANAGEMENT
What Are Employee Relations.....*By Alice Rice Cook* 73
PRODUCTION
Continuous Butter Making Successful in Wartime Germany *By Arthur V. Gemmill* 75
QUALITY CONTROL
New Consistometer Measures Corn Consistency *By M. C. Adams and E. L. Birdsall* 78
Quality Grades Are Essential for Frozen Food Packs *By Gerald A. Fitzgerald* 108
STATISTICAL METHODS
What Constitutes an Adequate Sample *By M. S. Anderson and C. W. Whittaker* 83
PACKAGING
Debunking A Color Theory.....*By A. Harsham* 85
ENGINEERING
Evaluating Screw Conveyors for Materials Handling *By D. O. Mocine* 86
Air Loading Simplifies Bulk Shipments..... 104
CANNING
Salmon Canning 90
SANITATION
Using DDT for Fly Control *By Leslie A. Sandholzer and J. M. Lemon* 94
ELECTRONICS
High Frequency Heating Produces Mold-Free Bread *By W. H. Cathcart* 98
RESEARCH
Freezing Point Data Sheets and Cooling Curves — Part II.... 100
ECONOMICS
How To Buy Poultry *By Lt. I. L. Williams and B. W. Gardner, Jr.* 106

EVERY MONTH

Editorials.....71 and 111
The Talk of the Industry..... 72
Automotive 104
New Packages and Products.....114
Food Industry News.....119
Changes in Food Supplies.....156
What Washington Thinks.....158
Men, Jobs and Companies.....161
Food Equipment News.....168
Catalogs and Bulletins.....191
Food Technology—Abstracts.....197
Books 213
Patents 217

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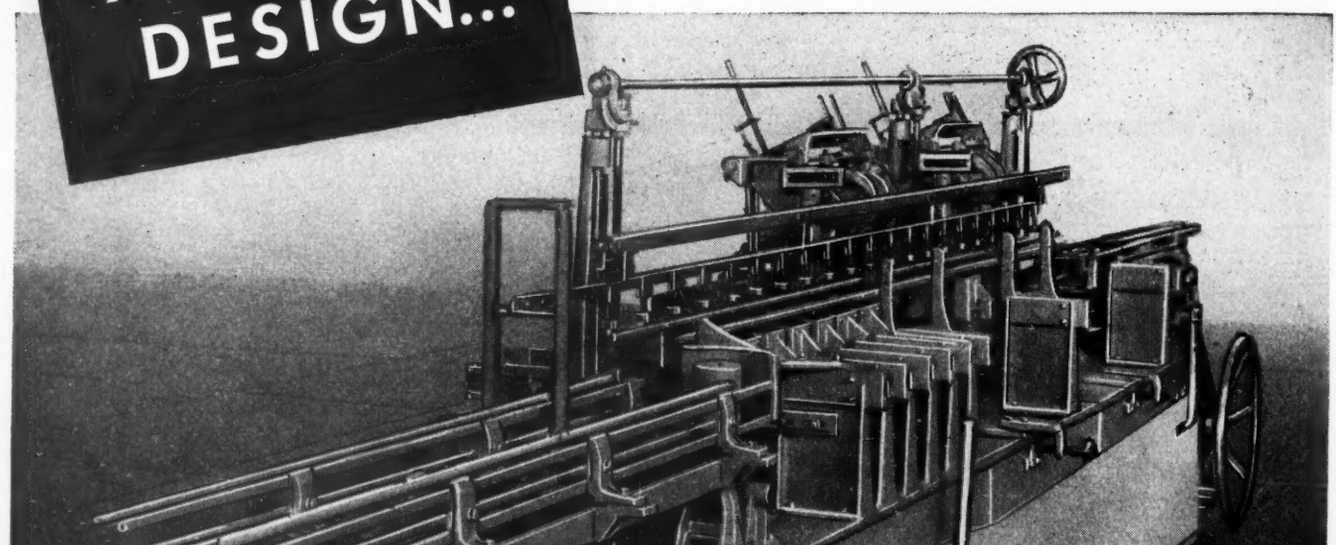

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Food Muddle Grows Worse

AMERICA, as well as what we whimsically call civilized humanity, is facing a growing problem of getting enough to eat. The tragedy of it is that a goodly portion of the trouble is strictly Made in America. Not all the responsibility can be laid to OPA, U. S. Dept. of Agriculture or the weather.

Everybody knows that the principal way to meet the world famine is by sharing food supplies through the agency of UNRRA. But UNRRA cannot create food, and many of its hopes are completely upset by doings here in America. Strikes and consequent lost production of vitally needed things will have a far reaching longtime sequel.

Britain states the problem in simple terms. The world's need for imported food is calculated to be 32,000,000 tons (which I estimate will keep from 80 to 100 million people barely alive for a year). This huge amount of food compares with the normal food imports of the world of 12,000,000 tons. United States and Canada are expected to ship 21,000,000 tons. They normally ship 6,000,000 tons. Yet in spite of all that has been done to date, there will be a deficit of 8,000,000 tons from North America. The foregoing North American calculation appears to include WFO 144 and its amendments, especially the one cutting our flour consumption by 25 percent.

How to meet the 8,000,000-ton North American deficit is UNRRA's great problem. On May 12 there was an effort to persuade the President to order further reduction of wheat consumption to only 25 percent of 1945 consumption. Save for a dangerously small reserve, most of our wheat would be exported. Further plans were to double the rate of slaughter of meat animals, to can the meat for export, to halve our consumption of dairy products, fats and oils and export the amount saved, and to ask the American people to subsist largely on potatoes and oatmeal until July.

Herbert H. Lehman, ex-governor of New York, ex-banker, and spokesman for the plan, has been assured by certain agricultural economists that it is perfectly feasible. Mr. Lehman is unquestionably an idealist. Often he has been advised only by agricultural economists, nutritionists and theorists but never, so far as I can learn, has he been advised by a competent industrial food technologist. Fiorello H. LaGuardia, successor to Lehman as head of UNRRA, has not yet remedied the deficiency. I am not questioning the need for food exports to save millions of lives: I am merely looking into the technical possibilities involved while keeping this country going and its people fed.

The May 12 plan is unrealistic and uncoordinated with the known facts of life in the United States. It may be good agricultural-economic theory to ask the people of this country to eat direct consumption foods this summer in order to permit the urgently needed food exports to relieve famine overseas. But the planners have given no apparent thought as to what we shall eat next winter, nor of the perishability of much of our seasonal food supply, nor of the effect of the coal strike on food preservation.

It is not an exaggeration to say that unless coal mining has been permanently resumed—not merely for a temporary truce to be changed at John L. Lewis' pleasure—by the time these words can be published, America will have considerable difficulty in feeding itself, let alone help feed the world in the winter of 1946-1947.

No Containers—No Preservation

Steel, coal, glass, tin, rubber, paper and transportation are vitally necessary to the preservation of perishable foods. Extra quantities of cans will be needed, but where will the steel come from if mills are down? The glass container industry is not big enough to carry the additional load. Frozen food production is only 4 lb. per person. Without coal, where shall we get enough heat and electricity to operate all our canning, freezing and dehydrating plants when the perishable foods are ready for harvest? Remember: We are to ship nearly all other foods overseas under the plan. And lastly, without coal how shall we distribute food at home, or transport it to seaboard for export?

Unless the strikes stop and everybody gets back to work very soon, the United States will have plenty of trouble feeding itself without fulfilling its commitments to UNRRA.

John L. Lewis, William Green, Harry Bridges, Philip Murray and other leaders of striking organized labor, and a Congress, that permits creeping paralysis of all our industries, must share the responsibility for any food shortage or default to UNRRA.

H. V. Burton EDITOR

The Talk of the Industry

• JOHN L. LEWIS' arrogance suggests that something has gone to his head. Whom the Gods would destroy they first make mad.

• LEST you may have overlooked this bit in your daily paper, let it be recorded here that Clarence Francis, chairman of the board of General Foods, was commissioned a Kentucky Colonel on May 3, 1946.

• ELECTRONIFIED is a new word to add to your vocabulary. Vincent C. Giordano, general manager of Clara-Val Packing Company, has used it to refer to prunes that have been treated by an electronic sterilization process.

• WE learned something about communism the other day by eating breakfast at a lunch counter about 5:30 a.m. A portly chap on the next stool wanted to talk about communism, said he was writing a book about Russia and communism, that he had been writing all night, which accounted for his being up so early. Asked how long since he had been in Russia, he replied that he had never been there; that all he needed to do was to go to the public library to learn all that was necessary.

Such absence of firsthand knowledge probably accounts for much of the favorable misinformation about communism that is played up continually before the American public.

• WATERMELON seed is with us again. A subscriber expresses the opinion that our proposal to salvage watermelon seed from restaurants "wouldn't be very sanitary." Well, maybe not. But we believe that such seed properly washed would be as sanitary as seed saved by orthodox mechanical pulping and fermentation in miscellaneous barrels at some seed farm. Probably either is plenty sanitary but lacking in aesthetic attractiveness.

• PEOPLE are cashing their war bonds, presumably to pay living expenses—there is not much else to buy. Treasury reports show that $552,000,000 in E-Bonds were redeemed, compared to $442,000,000 sold in April. This means that $110,000,000 of consumer buying power was lost in that month. When the May figures are available, after all the shut-downs, the presumption is that the lost buying power will be still larger.

• SPEAKING of speed, how's this one? On a Thursday morning we discovered that we needed a certain document that could be obtained only through our London office. A cabled request had it in New York by air on Monday.

• THIS story first appeared in the London Times and later was verified by our State Department. In February, 1946, Russia notified France that the latter could buy 400,000 tons of wheat and 100,000 tons of barley for U. S. dollars, provided France sent ships to pick it up. Lacking French ships, our War Shipping Administration sent three American vessels to Odessa, where they were told no wheat was available. Nice people.

• SOME odd things turn up in government documents, such as the report on the Pace Bill, H. R. Report No. 1185. Listed among the commodities included in the index of prices *paid* by farmers are the following used in living:

Apples, bread (white), butter, cheese and vinegar.

Also the following used in production:

Corn, hay, alfalfa and oats.

The prices of the foregoing items, which the farmer or his wife might be expected to produce, are evidently "boughten" items that enter into the parity price ratio.

Hors d'Oeuvres

• *A lot of people will agree with Arnold de Nova Villa, who said—back in 1310—that wine strengthens the natural heat, clarifies turbid blood, opens the passages of the whole body, strengthens the members and makes the soul merry, letting it forget sadness. Remember, this was written long before the University of California labs hit upon adding vitamin B_1 to "separate out" the morning after "head."*

• Borden's claims that when Admiral Byrd made his last trip to the South Pole, he took along two refrigerators to keep the milk warm. Bet when they got them going good, they could cook up some nice crisp ice cubes, too.

• *A physician, says the Electrical Manufacturers, by use of ultra-violet light, now can determine within seconds in advance of the usual signs, whether or not patient is dead. Naturally, the patient would want to know as soon as possible.*

• Gravediggers belong to the United Agricultural Canning and Packing Workers Union, which gives us a brand new slant on this preserving business.

• *If you've never heard of a food product called "Zest" you are twice as uninformed as you might be ordinarily. If you call for Zest in the distribution area covered by the American National Corp., Randolph, Mass., you will get a tomato and clam juice product, while in the area of Langendorf United Bakeries, Inc., San Francisco, you'll come up with a breakfast cereal. What happens if you strike a place served by both is enough to make a copyright lawyer's mouth water.*

• An accountant in Queens, N. Y., advocates the use of orange, grapefruit and lemon skins for advertising purposes. He visualizes a dignified slogan for a cereal company as a breakfast tieup. The man is just trying to crowd out Sunkist, that's what.

• *It is said that now you can get a toaster that pops the finished slice into a compartment to keep it warm. When they invent one that pops some butter on the toast, that's when our aloofness will melt.*

• And now we're told to pour canned orange juice back and forth from can to glass, etc., several times in order to put air into it, which makes it taste more like the fresh. The housewife is going to have to hold on to her wits to remember whether to thaw it, soak it, or blow it up.

• *Ceiling prices are at least 525 years old. In 1421, the mayor of Coventry proclaimed that table wines should sell for eightpence and dessert wines for 16 pence per gallon, "and no dearer," and that no tavernkeeper could store wine in his establishment until the mayor had tested it. Bet that last provision makes the OPA drool with envy.*

J.A.J.J.

Harris-Ewing

One of a series of conferences held to discuss human relations. These groups, composed of the heads of various departments, form the core for any successful training program.

What Are Employee Relations?

When this question was put to various employers the answers for the most part were vague and incomplete. Here is a detailed analysis, together with factors to be considered before such a program can result in successful man management

By ALICE RICE COOK
Consultant on Personnel Relations, New York, N. Y.

IN recents visits to a number of food plants, varying from less than one hundred employees to several thousands, the fine equipment and the production control methods in use were impressive. The food men seem to be licking operating problems under most difficult postwar circumstances.

The story was a different one, however, when these same food executives discussed their man management programs. Men who enthusiastically talked about operating controls became vague and uncertain when they referred to the possibility of extending methods of cost control into man management. Practically every executive agreed that good employee relations are a "must" for labor efficiency, but no two agreed as to *what* employee relations are or *how* they might be established.

Here are some of the points of view about employee relations as expressed by the various food industrialists. One manager of a bakery, with good lighting and ventilation the chief immediate aims of his newly established personnel relations plan, stated, "If a man can see what he is doing, he will do good work." Another manager, in answer to the question of what was being done in his plant to foster good relations, pointed with pride to a single new shower in a rest room used by 100 women. In this rest room, by the way, there were exactly three chairs! In another plant, a very pleasant vice-president assured me that his employment manager was competent to deal with any personnel problems that might develop in either the plant or the office. One employee relations program was built entirely around a safety program—and a very good one.

Several executives emphasized contractual labor relations as the most important part of their personnel work, saying, "Good labor relations mean contented workers." One young personnel director enthusiastically pointed out a large collection of bowling trophies as evidence of successful employee relations. He himself had been a bowling champion at school. In another place, an excellent employees' magazine was shown as "the best means of maintaining good employee morale." And then, there was the personnel man who

The plant cafeteria is but one of the many prerequisites for a successful program of employee relations. It should be designed to present a cheerful atmosphere, with cleanliness the operating rule. Careful attention in the preparation and serving of nutritious food must be given.

said, "We just hire them and hope we won't have to fire them!"

What Are Employee Relations?

The climax came when a newly appointed employee relations director of a large bakery manufacturing chain, after asking me for the names of some of the best books on personnel said, "What *are* employee relations, anyhow?"

To this man has been delegated the terrific responsibility of organizing a new department, of choosing and training personnel to handle employee relations problems, of training supervisors in job relations, of setting up and maintaining personnel procedures influencing directly the well-being of thousands of employees and indirectly influencing the opinions of millions of potential customers. This same company is carrying on an extensive public relations program, totaling expenditures of hundreds of thousands of dollars. Yet in its employee relations, the very heart of good public relations, the company has chosen as director a man with no personnel training or experience. In fact, the only experience the new director has had was being the manager of a bakery.

Employee relations are the key to the management of men. They consist of John Brown's attitude and feelings toward the people around him, what he thinks about his job, his ideas about himself as a person and his place in the sun, his opinions of the company and his relationship with organizations. These opinions and reactions of John Brown, added to those of all the other employees in a given company or department, determine the labor efficiency of the group. A cooperative and interested John Brown, working in a bakery or coffee plant, means that good employee relations exist in that plant. Good employee relations ensure good relations with the public, consumers, customers and unions. If John Brown does not get personal and job satisfaction from the company for which he works, labor relations problems are inevitable, regardless of the most elaborate consumers' services or glamorous public relations devices.

Purpose of Employee Relations

The purpose of an employee relations program is to make sure that John Brown, from the minute he enters the plant as an applicant until the time he leaves the company for good, develops a feeling of satisfaction from his relations with everyone around him and from the conditions under which he works. To achieve this end, John Brown must be the focus of any successful employee relations plan. Executives faced with the responsibility of setting up a personnel relations program will do well to reexamine, in the light of John Brown and his feelings, the two principles underlying all human relations:

1. John Brown is exactly *like* all the other employees, all the executives and all the stockholders, in wanting recognition as a person, security, a feeling of belonging to a group, new experiences and an opportunity for activity.

2. John Brown is *different* from every other person in the plant because of his experiences and background. He reacts to situations in terms of the picture he has of himself, a constantly changing picture that may have little relation to real conditions.

An effective employee relations program recognizes both the similarities and differences existing in John Brown and his coworkers, without falling into the pitfalls of a paternalistic point of view. Man management demands the same planning and attention as job management if the profits from improved methods of production control are not to be lost through lack of manpower control.

Setting Up the Program

What is the first step in setting up an employee relations program? Only under the leadership of an enlightened group of executives and supervisors can an employee relations plan hope for success. An overall personnel code should establish standard practices and policies for every aspect of personnel procedures. Such a personnel code should be made the first step in the establishment of the program.

Who should be responsible? The program belongs under the general management of the personnel administration manager or the vice-president in charge of personnel, and under the direct supervision of a trained personnel relations head. The present practice of promoting production men to personnel positions has many dangers as well as obvious advantages. Only a person trained in personnel procedures and understanding operating problems can have an overall picture of John Brown as a worker and as a person. John's relations to the company and his job must be built up and maintained if John is to justify his place on the payroll.

Things to Be Considered

What should be included in an employee relations program so as to ensure a cooperative and satisfied employee group?

1. Sound employment practices, friendly induction and farsighted separation procedures—The initial impression an employee receives at the time of his employment often colors his future relationship to the company. Understanding interviewers, job analyses, cooperation with supervisors, a testing program and courteous treatment during medical examination go to make up positive feelings of employee satisfaction.

Courteous induction to the department and the job builds attitudes of cooperation and interest. An employee counselor is valuable in seeing

(*Turn to page* 218)

Continuous Butter Making Successful in Wartime Germany

High speed, continuous butter-making methods, disclosed in Europe, reduce labor costs and butterfat losses. One system utilizes a special churn. Another system employs a novel phase-reversing machine for making butter

By ARTHUR V. GEMMILL, Assistant Editor, "Food Industries"

INFORMATION has just been received from Europe on recently developed German butter-making machines, indicating that the American dairy industry soon may be able to use continuous butter-making processes which are apparently more efficient than present churning methods. One of the machines, procured in Germany by a Quartermaster Corps Intelligence team, has just arrived in the United States for testing. Experiments are being conducted for the Army by the Research committee of the American Butter Institute, under contract to the Quartermaster Food and Container Institute. They are under the supervision of Dr. H. A. Ruehe of the dairy husbandry department, University of Illinois. Results of the tests will be made available to American industry after research is completed.

British Publish Report

A team from the British Intelligence Objectives Subcommittee has already published a report on "Some Developments in Dairying in Germany."[1] In this report, two continuous butter-making processes now finding general use, are described. One of these, the Alfa process, was worked out by Prof. Möhr, of the University of Kiel, in conjunction with the Alfa Laval Company and its affiliate, the Bergedorf Eisenwerke. The other, the Fritz process, was developed by Dr. Fritz, professor of dairy machinery at the Dairy Institute of Freising/Weihenstephan. Descriptions of the equipment, processes and illustrations given below were taken from the British report.[2]

Both processes have been used for the manufacture of unsalted sweet cream butter of German legal standards. These standards, it should be noted, permit 20 percent moisture.

The Fritz Process

Work was started by Dr. Fritz, about 1939, in an effort to produce a machine that would churn butter continuously. By 1942, he had developed the process to a point where there were several commercial installations in operation. At the present time, there are reported to be 40 plants using the process in various parts of Germany.

The novel part of the Fritz process is the continuous butter-making machine or churn (Fig. 1), which is made in three sizes, with capacities of 1,000, 2,000 and 4,000 lb. of butter per hour. In this machine, cream enters a horizontal water-cooled cylinder *A*, where in about 1½ seconds high speed dashers convert it into butter. The mixture of butter granules and buttermilk is separated in a chamber *C* by the action of two screws.

In the smallest machine, the water-cooled cylinder is about 10 in. in diameter and 10 in. long. On a horizontal shaft are mounted two half-length and two full-length dashers *B* that rotate at a speed of 3,000 rpm., clearing the inside wall of the cylinder by about 0.04 in. The discharge

Officials supervise uncrating of a German continuous butter-making machine recently received in the United States for testing. Official U. S. Department of Commerce photograph.

1. "Some Developments in Dairying in Germany." British Intelligence Objectives Subcommittee, Final Report No. 85, Item Nos. 22 and 31. London. H. M. Stationery Office.

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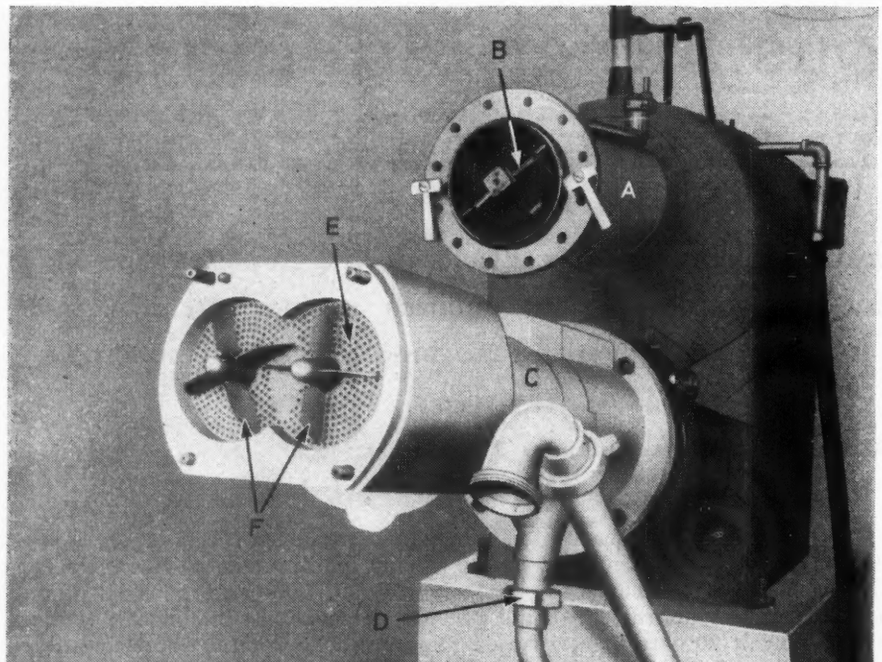


FIG. 1. Fritz continuous butter-making machine partly dismantled to show some of the unusual features. From British Intelligence Objectives Subcommittee Report.

from *A* leads into the top of the separating chamber *C*, which is inclined, in order to permit the buttermilk to drain away from the butter through the outlet pipe *D*.

Separating Chamber

In the separating chamber are two intermeshed stainless steel screws which rotate in opposite directions at a speed of about 40 rpm. The screws are approximately 18 in. long and 6 in. in diameter, and are mounted on 4 in. centers. At the discharge end of the separating chamber is a rectangular opening through which the butter is forced. The size of this opening can be varied by a metal gate that is adjustable vertically from the outside of the chamber. After being forced through the rectangular opening, the butter enters a chamber about 6 in. long, with two screws similar to those in the separator. These screws force the butter through perforated plates *E*, from which it is removed, and at the same time worked, by the rotating scrapers *F*. It is then extruded through a rectangular opening in the end of the chamber.

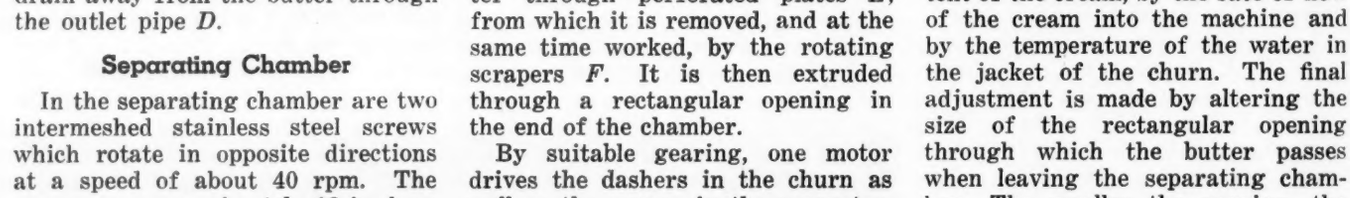
By suitable gearing, one motor drives the dashers in the churn as well as the screws in the separator. In more recent models, two electric motors are installed. One motor drives the dashers, while the other rotates the screws. One advantage of having separate motors is that if a batch of butter has to be made by the conventional churning method, it can be "worked" by the screws. This method of working is said to increase the yield of butter by 2 percent as compared with the usual procedure.

In the Fritz process, raw milk is heated to about 115 deg. F. and separated to produce cream of from 40 to 45 percent butterfat. The cream is pasteurized at 203 deg. F., then cooled to between 45 and 50 deg. F., depending upon the firmness of butter desired, and stored in a large blending tank. From the blending tank the cream is pumped to a small control container or surge tank that maintains the flow to the churn at a constant pressure and an adjustable rate. The butter emerges from the end of the churn in a form convenient for wrapping and packing.

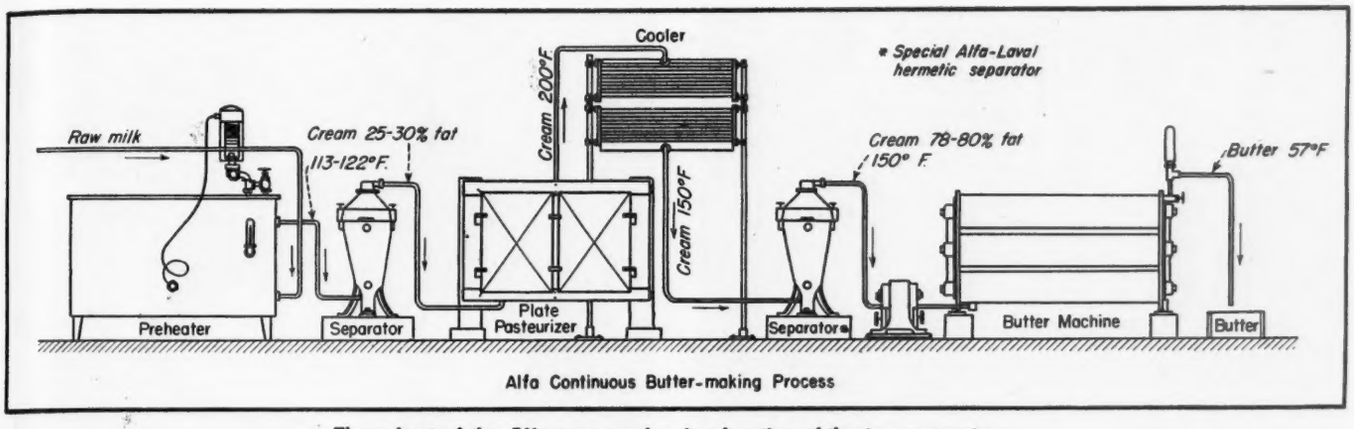
Composition of the Butter

The butter leaves the machine at a temperature of from 50 to 55 deg. F. and is said to be more plastic and spreadable than butter produced by conventional churning methods. The composition of the butter, as made in Germany at present, is 78 to 79 percent butterfat, 1.5 to 2.0 percent solids-not-fat, and 20 percent moisture. Dr. Fritz has stated, however, that butter with as little as 11 percent moisture can be made by this process.

The moisture content of the butter is determined by the butterfat content of the cream, by the rate of flow of the cream into the machine and by the temperature of the water in the jacket of the churn. The final adjustment is made by altering the size of the rectangular opening through which the butter passes when leaving the separating chamber. The smaller the opening, the lower will be the water content of the butter. The ideal cream temperature varies with the particular type of plant, with the cream used and with the properties desired in the butter. It is approximately 44 to 46 deg. F. in summer and 46 to 50 deg. in winter. The cooling water in the jacket of the churn is maintained near 40 deg. F. with the result that



Flow sheet of Fritz process showing how the novel continuous churn is used in conjunction with conventional butter-making equipment.



Flow sheet of the Alfa process showing location of the two separators and the special machine in which heavy cream is converted to butter.

the temperature of the butter is not raised in the churn cylinder.

If butter with sufficiently long storage life can be made by the Fritz process, the advantages are obvious. Operation is continuous and the equipment is easily cleaned. Moreover, the saving in labor is said to be as much as 70 percent. The buttermilk, which normally contains from 0.4 to 1.0 percent butterfat, is sweet and can be separated, the butterfat being returned to the churn.

The Alfa Process

The Alfa process of butter making uses methods and equipment not previously applied to the manufacture of butter. Basically, it is a centrifugal separation of butterfat from hot cream in an air-tight separator, followed by a reversal of the fat-in-water phase of the emulsion. The phase reversal, which is the actual butter-making operation, takes place in a specially constructed cooler. All liquid is separated as skim milk in the centrifugal units. There is no buttermilk in this process.

The hermetic Alfa-Laval separator, used to separate the hot cream, differs from the type used for milk in that the holes in the plates are nearer to the periphery. The cooler (Fig. 2) is made up of three cylinders about 6 ft. long and 1 ft. in diameter, mounted one above the other. Inside each cylinder is a rotating drum *A* approximately 0.4 in. smaller than the inside diameter of the cooling cylinder. Mounted on each drum are several spiral ridges *B*, machined to clear the inside of the barrel by 0.03 in. The bottom and center cylinders are cooled with brine at a temperature of about 25 deg. F. The directional flow of the brine is the same as that of the cream. Water is circulated through the jacket of the top cylinder.

Centrifuged Twice

In the Alfa process, fresh raw milk is separated at a temperature of from 113 to 122 deg. F. in a hermetic or air-tight separator, to give a cream of 25 to 30 percent butterfat. The cream is pasteurized at 203 deg. F. in a plate unit, then cooled to about 150 deg. F. Next it flows to a special Alfa-Laval, type 181, separator in which the cream is concentrated to about 78 percent fat. It is claimed that the fat content of the skim milk from this separator is less than 0.05 percent. The rich cream, at a temperature of about 150 deg. F., is delivered by a variable speed pump, into the bottom cylinder of the special cooler, where it is cooled to about 68 deg. F. In the center cylinder the cream is cooled to between 48 and 50 deg. F., at which temperature the fat-in-water phase

(*Turn to page* 230)

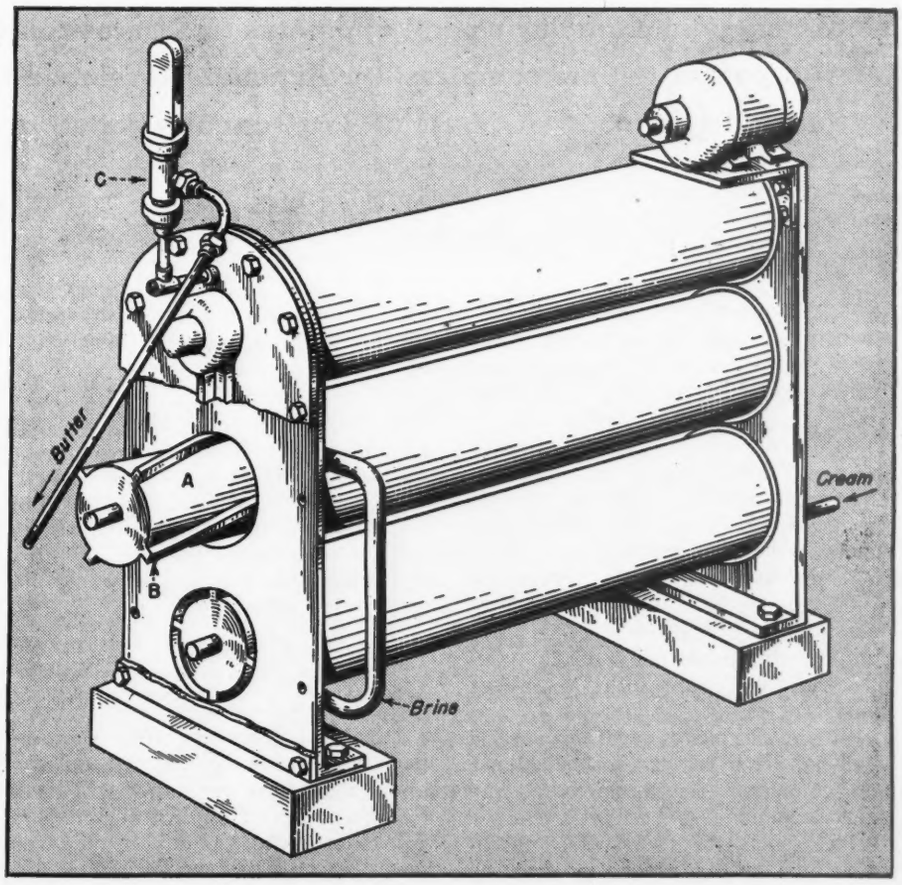
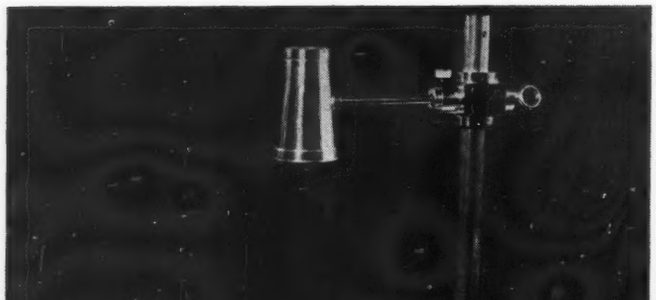
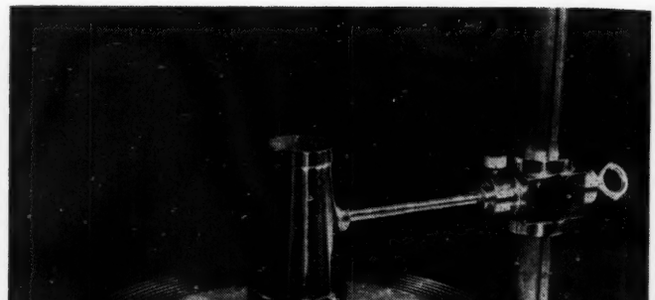


FIG. 2. Alfa continuous butter-making machine with end plate broken to show design of the rotating drums. From British Intelligence Objectives Subcommittee Report.



The Adams Consistometer, shown empty on the left, has a measuring scale of numbered concentric circles, ¼ in. apart. The truncated cone, open at the ends, is raised or lowered on the vertical rod.



The bottom of the cone fits the inner circle. Material to be tested is placed, level full, in the lowered cone. Picture at right shows how thin consistency corn flows out in 30 seconds after lifting the cone.

New Consistometer Measures Corn Consistency

A new type of quality control apparatus measures consistency in such a way that two people get the same results. Although developed to measure consistency of cream style corn, it is useful for pancake batter, apple sauce and preserves

By M. C. ADAMS and E. L. BIRDSALL
The Kroger Food Foundation, Cincinnati, Ohio

A NEW DEVICE has been designed and constructed that quickly and accurately measures the flow of cream style canned corn. It enables a grader to express consistency objectively in terms of a score and free from the personal element. The instrument has been designated the "Adams Consistometer." Its sensitivity is adequate for all practical purposes and the reproducibility of results has been demonstrated by different operators running duplicate tests of 25 samples ranging from light to heavy consistencies.

Within the past several years a need has been felt by both producer and consumer for a scientific and practical means of classifying canned foods. Such a system would facilitate the labeling of the product by the canner, and would also furnish the consumer with a yard-stick for evaluating various brands in relationship with her needs. There exist two schools of thought as to the best means of expressing this classification. One favors the plan whereby the quality of canned food is determined by allotting a numerical score to each of several factors applicable to a product, and allowing the total score to determine the final quality or grade. Such a grade would be one of the following:

Grade	Which means
A	A very fine quality
B	A good quality
C	A fair quality
D	A poor quality

This plan provides that the appropriate grade be carried on the label so that the consumer will have a single index of quality designation to evaluate the various brands for her.

The other school of thought contends that descriptive or informative labeling will be of greater value to the consumer. By this method, descriptive terms on the label will inform the consumer of the condition and quality of the product on the basis of the product's factors.

Problem of Objective Grading

Both groups are seeking objective means of measuring the various factors. Corn consistency, for example, when measured mechanically can be converted into scores, contributing to a grade, or can be converted into descriptive terms. That the consistency of cream style corn is important is attested by the fact that the United States Department of Agriculture's grades for this item allot 25 points for this factor, out of a total of 100 points. These grades provide 22 to 25 points for "heavy cream like" corn that "will mound to some extent" when poured into a

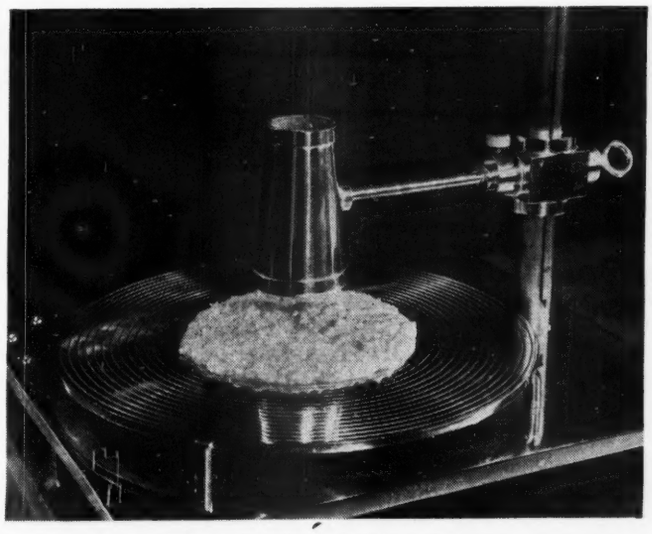
pan. Each of these scores qualifies the sample for an "A" rating in the factor of consistency. From 19 to 21 points are allowed if the corn "flows just enough to level itself readily," thereby qualifying the corn for a "B" rating in this factor. A rating of "C" for consistency corresponds to 16 to 18 points if the corn is "semi-liquid" or "jellified."

For some time consistency has been scored by merely pouring the corn from the can into the grading pan, and observing its tendency to mound or flow. From these observations the grader evaluates the consistency in terms of consistency score. The objection to this subjective method is that a skilled and experienced grader can not reproduce his own scores for the same samples on a blind basis, and two experienced graders can achieve only a limited degree of concordance.

The National Canners Association, in its program for descriptive labeling, has recommended the following label statements describing cream style corn consistency: "Heavy Consistency," "Medium Consistency," or "Light Consistency." This type of labeling also needs a reproducible method for defining the type of consistency so that the label statement can be properly and dependably applied. An objective method of consistency determination was needed.

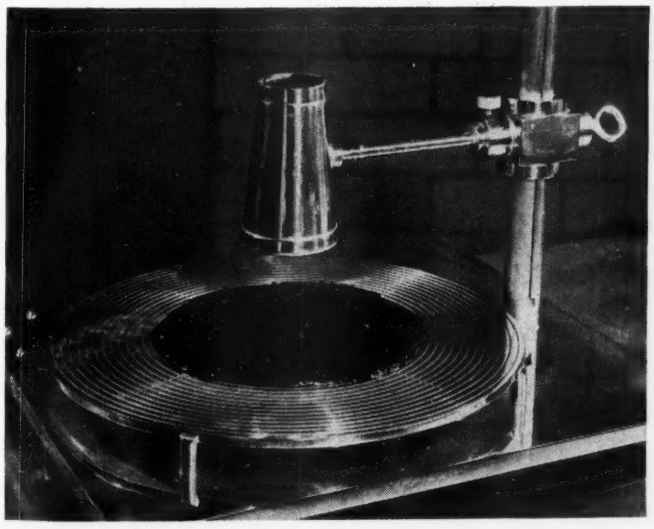
The Bostwick Consistometer was considered. This device consists of a channel 2 x 12 in., with sides 2 in. high. A centimeter scale is etched on the bottom. The sample to be tested is trapped in one end of the channel. A gate is tripped, releasing the product which flows toward the other end. Thirty seconds after the release, the length of flow is recorded in centimeters. The use of this instrument is based on the theory that the length of flow is proportional to consistency. This method is an official procedure for determining the consistency of tomato catchup.

The Bostwick apparatus was not found to be applicable for cream style corn consistency measurement. Graders could not duplicate their results satisfactorily for several reasons. Its capacity was too small for an adequate sample. The small mass when released did not possess sufficient weight to extend the flow over a range adequate for good differentiation. Thus, the device lacked sensitivity. The measuring scale etched in the bottom of the channel is composed of straight, parallel lines



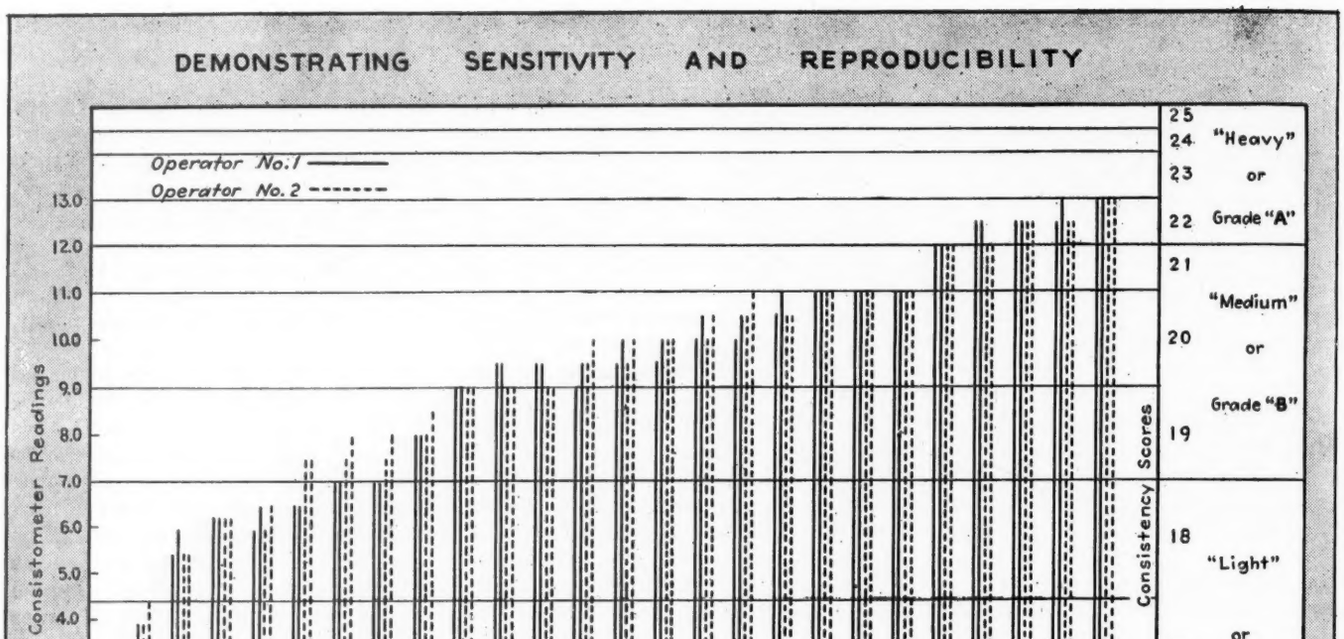
Corn of a thick or heavy consistency does not flow as far as a thin consistency corn.

The same objective method of measuring consistency is applied to apple sauce.



Exploring the possibility of consistency measurements of blackberry preserves.

Consistency of pancake batter is an important factor in evaluating pancake flour.



Two operators ran separate duplicate tests on 25 samples to demonstrate both the sensitivity and reproducibility of consistency readings of the Adams Consistometer on cream style canned corn.

spaced one centimeter apart, yet the advancing line of flowing corn forms an arc. To determine what graduation under this arc to record as the measure of consistency led to inaccuracies and encouraged divergent results by different operators. Another inherent limitation is that the sample of corn is allowed to flow in one direction only, and is restrained in all other directions.

In reviewing the objections to the use of the Bostwick Consistometer for the measurement of corn consistency, it was realized that the limitation imposed by the use of small masses of material could be overcome by increasing the capacity of the machine. The problem of measuring an arc with straight lines, however, could not be solved by curving the measuring lines since, under conditions of restrained flow and with varying consistency, the curvature of the arc was not always the same.

Theory of New Design

A new consistometer was visualized, designed and constructed, embodying principles that would accommodate a greater mass and measure the unrestrained flow in all directions by means of concentric circles. This new device consists of a large metal disk upon which are engraved 20 concentric circles, increasing ¼ in. in radii. A steel truncated cone, which can be lifted vertically, fits tight against the disk so that the circumference coincides with the innermost circle. The cone holds approximately 14 oz. of cream style corn. To operate, the cone is pushed tightly against the disk, filled level with the sample to be tested, and then lifted upward allowing the material to flow unrestrainedly over the disk. After 30 seconds the extent of flow is ascertained by averaging the flow at four quadrant points. A flow of 4½ in., measured along a radius, extends from the innermost circle to the outermost circle, designated Circle 1. Any material flowing to this extent would have a consistometer reading of "1." Material flowing out to a radius of 3 in. greater than that of the innermost circle would reach Circle 7 and would therefore have a consistometer reading of "7." Hence, the lower the numerical designation for consistency, the thinner the material; and conversely, the higher the numerical designation for consistency, the thicker or "heavier" the material.

Practical Results

This laboratory has had wide experience in the field of grading and evaluating the quality of canned foods. The first task after the completion of the consistometer was to attempt to calibrate it by tentatively correlating consistency scores with Adams Consistometer readings. A large number of samples were scored and the consistencies determined by this consistometer. After accumulating a large amount of data the following table of equivalents was formulated:

Consistometer readings	Consistency scores
14½ to less than 15	25
14 to less than 14½	24
13 to less than 14	23
12 to less than 13	22
11 to less than 12	21
9 to less than 11	20
7 to less than 9	19
4½ to less than 7	18
2 to less than 4½	17
Less than 2	16

The next test was to determine the differentiation and reproducibility of consistometer results over the practical range of consistency scores.

(*Turn to page* 226)

What Do We Want From Germany?

Here is an opportunity for those in the food industry to benefit themselves as well as the food industry as a whole. Help is needed by the government in securing and compiling, for release, valuable data on German industry and science

By PRISCILLA A. DEUTSCH, Staff Editor, "Food Industries"

YOUR GOVERNMENT is offering you a chance to share in the war's reparations—reparations in the form of technological information that has been amassed in Europe through official investigation. This includes scientific and technical data in all fields of industry and research. It covers testing methods, chemical research, new products, new materials, production methods and plant development.

Ever since American troops entered Germany, American investigators have been combing the German industries for information useful to American companies. Over 400 American scientists and industrial men have gone into Germany and brought back reports. These reports, considered secret during the war, are now being released by the Technical Industrial Intelligence Branch, Office of the Publication Board, U. S. Department of Commerce, in a weekly publication entitled "Bibliography of Scientific and Industrial Reports." Up to the end of February approximately 2,500 reports had been released with about 14,000 awaiting release. Orders for an average of 4,000 copies are received each week. A card file of subjects covered is maintained for consultation by the public. The subject matter of the reports ranges from automotive and broadcasting equipment through plastics and quick freezing of foods to zinc. More than 20,000 reports had been received and unpacked as of May 3, 1946. An abstract of each report is prepared by a qualified technician.

It is estimated that over 100,000 items are available for dissemination, but in order to secure the most valuable and practical information, the government is asking your help so that they might supply you with data that will be most beneficial.

It is impossible for the government agency to determine what items of the enormous mass of material may be of value to American industry and science. There are tons of these documents. Therefore, their first request is that industry and science suggest and advise them as to what specific information should be sought, what new discoveries German scientists had made, what new processes they had developed and what German products were better than ours.

Qualified technicians to carry on the work of searching German files are needed. They will be used for the important job of supervision and selection. Routine work will be done by German civilians. A knowledge of technical German is essential. They will be appointed Federal employees for the duration of the mission, a minimum of six months. As Federal employees, investigators are sworn to report all findings to the board, which will make the reports available to the public. It is necessary to secure these experts to study the documents collected from all over Germany, translate and edit them and send back anything that may be of value to American business and science. Recommendations on available, qualified personnel are requested by the Department.

Microfilming

Part of this program comprises the microfilming of original German documents. It is hoped that a great majority of the data can be microfilmed directly on the spot. Technically trained experts are selected to choose the material to be produced.

Documents, microfilmed in Germary, are studied and abstracted with the aid of a microfilm "reader" at the Office of the Publication Board, U. S. Department of Commerce. The microfilming of German data on the spot not only results in tremendous space and time saving but makes possible the securing of information that could not otherwise be obtained.

Abstracting the thousands of scientific and industrial reports received for distribution. When completed and catalogued, these abstracts are published in the "Bibliography of Scientific and Industrial Reports." Issued weekly, this is available to the general public through the Superintendent of Documents, Washington 25, D. C.

Microfilms will be distributed to the public in much the same manner as the regular reports.

The Department recently stated: "Right now some of the TIIB men are seeking to salvage information from some documents which the Germans hurled down a well, then covered with liquid oxygen in an attempt to destroy the papers. Our men investigated the well and found that it would be impossible to take the papers out without damaging them further. So now, we're making arrangements to have the material microfilmed right at the bottom of the well."

By the microfilm method, it is possible to secure data not otherwise available. This is particularly true of bulky documents or materials that are damaged or difficult to move. Moreover, microfilming on the spot saves considerable time in packing, transportation, unpacking and storage. It makes possible the more rapid receipt of material for abstracting.

Approximately 16½ in. of printed matter can be produced on 1 in. of film. An average 300-page book can be reproduced on 7 ft. of microfilm and between 700 and 800 newspapers can be transferred to a 100 ft. roll.

Storage of data secured is also simplified. A roll of 100 ft. of microfilm can be stored in a space 4x4x1 in. Whereas it would take approximately 15 four-drawer letter-size cabinets to store 250,000 douments, this same material can be recorded on 80, 100 ft. rolls of microfilm and stored in an ordinary desk drawer.

By use of the "reader," as shown in the illustration, documents reduced from 8 to 30 diameters on microfilm, can be projected back to readable size. For distribution of the microfilmed material, enlargements can be made, in various sizes, up to 37½ by 52½ in.

Special Missions

Special missions are another phase of the program. The Department asks that anyone desirous of organizing a group from industry or science, interested in specific German industrial methods, contact them. If the project appears to have value to American industry, necessary arrangements will be made. Information obtained in this way will be made available to all industry—it cannot remain the exclusive property of the investigators.

Worth-while Investment

That the investment the government is asking private industry to make is worth-while is indicated by the keen interest being shown by various organizations. Already teams of American investigators are being organized under the TIIB program to search the German pharmaceutical industry for information useful to them. Representatives of 13 firms met some time ago with the Department officials to make plans for the mission. Speaking to the group, Dr. Charles E. Reed, acting chief of the Chemical unit, TIIB, stated: "Scores of documents on new products and production methods filed in German offices and laboratories are there for the taking. Other information can be obtained by interviews with German technicians. But this information can be put to practical use only if American experts go over to collect, sort and evaluate data on the spot."

Food Industries Lag

Many of the early reports were obtained by an American civilian organization, known as the Technical Industrial Intelligence Committee, under the Joint Chiefs of Staff of the Army and Navy. These civilians were recruited from governmental agencies, science and industry. Approximately twenty groups made this mission. It is interesting to note that in comparison to other private industries represented, the food industry gave the poorest showing. Of the 17 men who represented the food industry only four came from private firms, the balance being government, research, educational and publishers' representatives. On the other hand, take a look at private industry's representation in some of the other fields:

Industry	Total No. Representatives	No. Representing Private Industry
Aeronautics	39	38
Automotive	13	12
Building material	11	9
Chemicals	33	22
Communication	18	16
Food and agriculture	17	4
Gen. industrial equip	26	21
Liquid fuels & lubr	26	20
Medical	12	10
Metals and minerals	54	40
Safety and technical	33	28
Textiles	37	27

From the reports now being released, it is evident that no small part of the information is pertinent to the food industry. In matters dealing with food and its allied products, the TIIB has placed Dr. Charles Magoon, Special Assistant to Research Administrator, U. S. Department of Agriculture, Washington, D. C., in charge.

Dr. Magoon points out that subjects of interest to the food industry that will be given careful consideration by the teams who are searching German technical literature include:

Animal feeds	Food machinery
Animal nutrition	Food processing
Biological chemistry	Freezing preservation
Dairy products	Human nutrition
Detergents	Refrigeration
Disinfectants	Substitute proteins
Fats and oils	Vitamins
Fisheries products	Wood saccharificat'n
Food bacteriology	Wood yeasts
Food crop improvement	Yeasts as foods and feeds

This is in addition to the investigations of new processes, new products and new machinery to be found in German food production plants.

No matter what the reason for food industry's apparent lack of interest during the earlier missions, the present opportunity should not be taken lightly.

WHAT CONSTITUTES AN ADEQUATE SAMPLE?

Control of quality and an appearance before Federal Trade Commission examiners are alike dependent on the fact that an analyzed sample must truly represent the entire lot. This article introduces a series on sampling and statistical methods

By M. S. ANDERSON and C. W. WHITTAKER
U. S. Department of Agriculture, Beltsville, Md.

THE housewife who looks at the top layer of apples in the bushel she is buying is taking a sample—possibly a very misleading sample. If she is distrustful of the grocer she makes him spill out the apples on the floor so that she may examine more of them. If she is sufficiently fussy she will examine every apple in the bushel. The last method increases the grocer's blood pressure and consumes the time of the housewife. Statistics teach that it is unnecessary. By spilling out the apples and examining a few at random she can reduce to a very low degree the probability of getting an inferior bushel of apples. She has taken an adequate sample.

The general problem of sampling in the food industries may be considered as an elaboration of this simple case. Consider the broker or processor who buys a carload of wheat, a thousand cases of eggs, a truckload of citrus or others of the long list of items that are bought in large quantity. Inspection of every case of eggs, every crate of citrus or every bushel of wheat is economically impossible, yet few things are of more importance to the buyer than that he shall be assured of the quality of what he buys. Inspection of every single item would make the buyer absolutely certain. But what buyer would not be satisfied if the chances of buying a bad lot could be reduced to, say, one in a hundred, one in a thousand or one in ten thousand? The chances of getting killed crossing the street within the next five years are about that great, but no one thinks of that. If the chances of getting a bad lot can be reduced to one in a hundred at about one one-thousandth the expense required for being absolutely certain, who would want to be absolutely certain? Scientific sampling, a branch of the very modern science of statistics, teaches how to be as certain of quality as may be deemed necessary—at the lowest expense. Some branches of the food industry have utilized the modern methods of sampling to the utmost. To them we extend our congratulations, and suggest that they spend no more time on this article. To those that have not done so we have a message.

Pioneer Work of "Student"

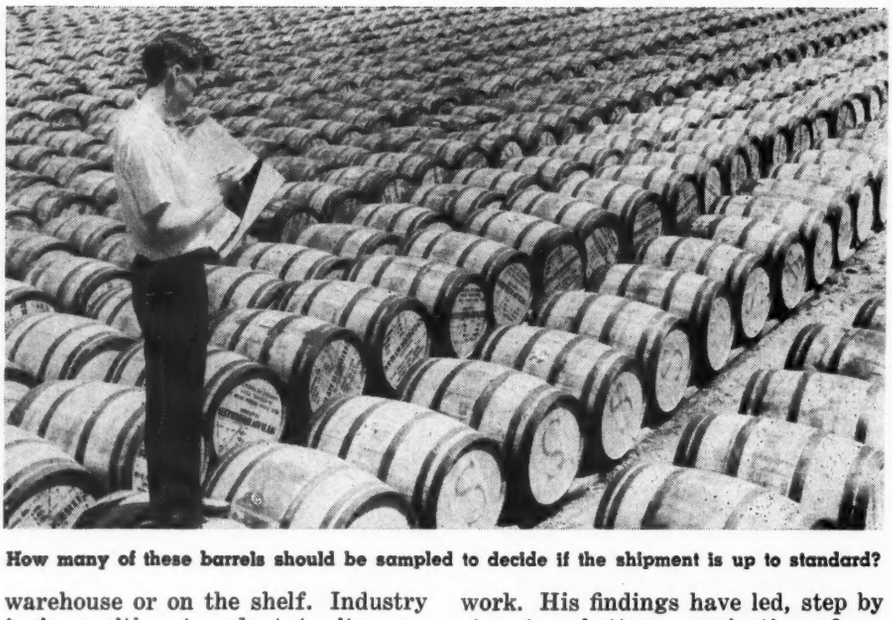
Present-day statistical methods of evaluating sampling procedures are based to a large extent on a publication that appeared in 1908 under the pseudonym "Student." His discussion of the significance of small samples was the outgrowth of an investigation of brewing methods and materials. Elaborated over the years, statistical methods were widely applied during the war for simplifying inspection routines. Some branches of the food industry have utilized these procedures, others can do so with profit. Food Industries has arranged for several authoritative articles on statistical methods. Subsequent articles will tell how to apply these modern procedures to the problems of food grading and quality.—The Editors.

Statistical Methods Applied

The purpose of this article is to indicate ways in which statistical methods, in the food industry, have become available for studying the adequacy of samples and for comparing the accuracy of sampling by different methods. Ways will be shown in which research organizations have been able to improve sampling technics. Examples will be given of the manner in which the efficiency of sampling may be tested, and how some of the food industries approach testing problems.

Do such apparently unrelated subjects as beer, mathematics and experiments with growing plants have any bearing on the adequacy of sampling food products? Examination of these topics has furnished industry with information whereby adequacy of a sample may be tested, whether it be a food crop growing in the field, a carload of farm products on the track or a unit of manufactured goods in transit, in the

Should orange crates be selected at random or by following some prearranged pattern?



How many of these barrels should be sampled to decide if the shipment is up to standard?

warehouse or on the shelf. Industry is in position to adapt to its uses certain ideas that have been developed in fields far different from those of present consideration.

Choice and Chance

Some of the high school algebra text books of a few decades ago had at the back of the book a chapter entiled "Choice and Chance." Instead of studying the chapter, the teacher usually announced to the pupils: "We will pass by this chapter because it is of little use and is not required in the course." The essence of this chapter, by-passed by each class of students, was not by-passed by a certain technician of the beer industry nearly 40 years ago. A beer manufacturer in Dublin, Ireland, wanted to improve his brew, so he hired a young technician with a mathematical background to work on the development of his product. This man, W. S. Gossett by name, began to make use of his mathematical background.

Statistical methods had long been used for handling data consisting of a large number of observations, a thousand or more. A thousand samples of beer, hops or barley are, however, obviously too many to be taken and tested by a manufacturer in the course of his work. Gossett began casting about for a way by which the laws of chance might suitably be applied to handling a much smaller number of samples.

He succeeded in his mathematical developments and presumably improved the brew of his employer. But what is of far more importance to civilization, he generalized some of the principles on the theory of small samples and published his work. His findings have led, step by step, to a better organization of experiments throughout the world, to better sampling and to a better understanding of the adequacy of samples taken.

The principles laid down by the technician of the beer industry have been developed by such men as Fisher in England, Snedecor in Iowa and many others in various parts of the world. The originator of the system, whereby statistical principles may be applied to small samples, chose to publish his work under a pseudonym. Thus, the name "Student" instead of "Gossett" is associated with the application of mathematical procedures to agricultural problems. The contributions of this great benefactor of civilization form the basis for many books and other scientific contributions and are rapidly finding application in the field of sampling.

System of "Student"

In order to survey the possibilities of the "Student System" as an aid to food industries, some examples of its use will serve to show how it may be applied to food crops growing in the field, to the analysis of products before harvesting and to the sampling of products ready for the trade. The system of "Student" provides a basis for determining such features as:

1. How many samples drawn at random (without conscious choice of selection) are required to assure a 99:1 chance that individual items of a product will vary by not more than 2 per cent in some characteristic that determines quality?

2. How does one system of sampling material within a car compare in accuracy of sampling with another system?

3. Does the selection of samples at random positions in a car provide a more precise or less precise method than making selections by some positional pattern?

It is obviously impractical to state, within the scope of a few paragraphs, the procedures used in calculating the differences in precision of two sets of samples drawn in different ways from a lot of goods. This is the field for textbooks. References to a few readable texts are, accordingly, included at the end of this article.

Working familiarity with a few of the most widely used statistical terms is as readily acquired by the manufacturing technologist as are chemical terms by such a person. Just as the term pH has come to be an expression of the intensity of acidity to the plant operator, the terms "F," or "F value," may be understood. The farmer talks readily about the P_2O_5 in his fertilizer and the manufacturer might equally easily learn something of what "t" test values mean to his business. Thus, there need be no fear of undue difficulty with technical terminology.

Illustrative Cases

In the growing of sugar cane it is of the utmost importance to be able to estimate the sucrose content of the cane in the field. In India, hit or miss methods of sampling for the sucrose determination had long been used, often with very poor results. Indian scientists undertook to devise more efficient methods of sampling and by means of a statistical study soon came up with two methods that gave about equally useful results. The method chosen, based respectively on so-called "clump" sampling (cane plants tend to develop into clumps) and on 2-ft. "strip" sampling, insured that the results, on the average, would be within 5 percent of the true value, 19 out of 20 times. This was considered adequate. It would have been just as easy to work out a system that guaranteed results to be within 5 percent, 99 times out of 100, but the sampling would have cost more. Such a system would, of course, have required a larger number of samples and more work.

Cottonseed oil, one of the great food products of this country, has been the subject of extensive investigation. In a statistical course, given in the Graduate school of the U. S. Department of Agriculture, data were presented to apply to sampling. Cotton seeds were taken from

(*Turn to page* 228)

Debunking a Color Theory

For years it has been believed that flies are repelled by yellow wrappers and that packages wrapped in foil will never become fly-specked. Here are the results of an actual test, which was conducted under carefully controlled conditions

By A. HARSHAM, Kroger Food Foundation, Cincinnati, Ohio

FLY-SPECKED packaged foods are unsanitary, unattractive and indicative of improper or inadequate housekeeping in retail stores. With the advent of warm weather, packaged foods in service and self-service type retail stores will serve as suitable surfaces for flies to alight on and speck. Those retail stores that merchandise fly-specked packaged foodstuffs are not likely to make repeat sales, particularly to health-conscious housewives.

Color Theory

Some investigators believe that certain colors attract flies and that others repel flies. Yellow objects supposedly repel. It is the opinion of many that foil-packaged items do not attract flies. It was, therefore, thought that practical information could be obtained, under technically controlled conditions, by ascertaining what effect the use of different colors on packages would have on fly attraction or repulsion. If certain colors repulse flies, modifications in packaging by the selection of fly-repelling packages should obviate fly-specking of packaged foodstuffs. Simultaneously, foil-wrapped packages were tested to determine their value.

Test Methods

Tests were conducted in a Peet-Grady chamber, size 6x6x6ft. Placed in the chamber were nine rectangular packages (3½x2⅞x1¼ in.). Seven packages were wrapped in identical type paper, varying only in color. Colors selected were purple, light yellow, lime green, dark yellow, orange, strawberry red and light red. The other two packages were foil-wrapped. All nine packages were suspended in the chamber. Approximately 500 flies were admitted into the illuminated chamber. A nutrient solution of milk and sugar was applied to the chamber floor. After exposing the packages to the flies for 48 hours, the total number of fly specks was counted. In addition, observations were made periodically to ascertain the relative number of flies on the different packages.

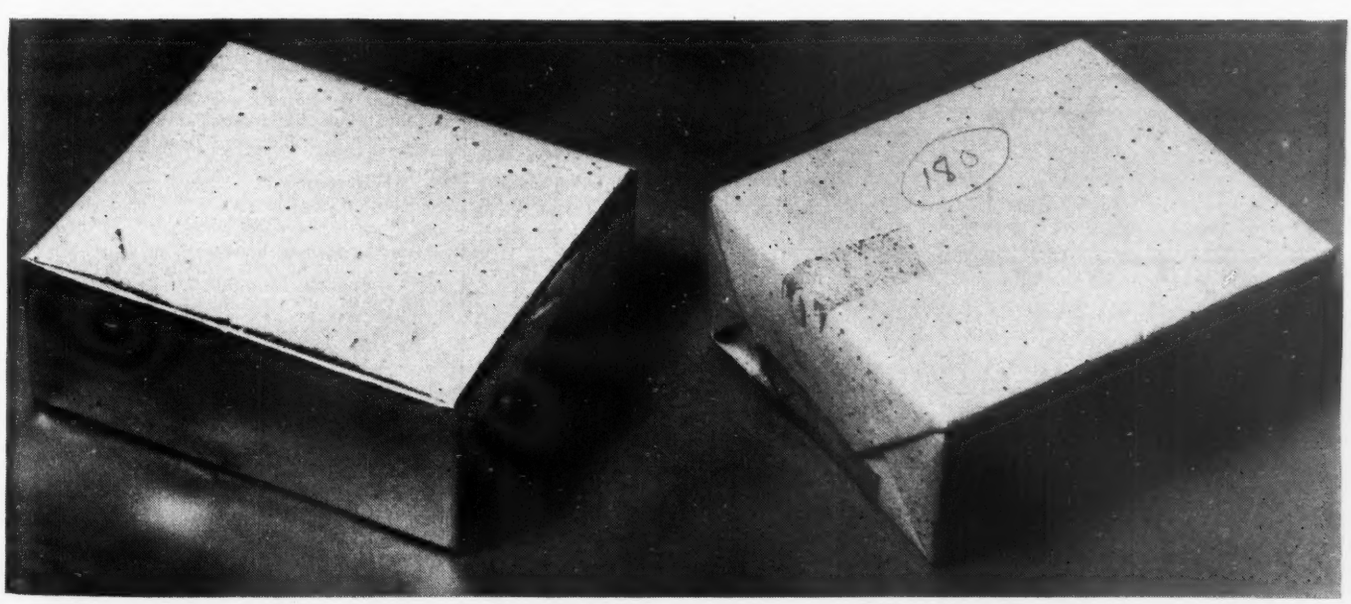
TABLE I—Effect of Packaging with Foil and Various Colored Wrappers on the Number of Fly Specks and Relative Numbers of Flies on Packages

Type of wrapper	Number of fly specks	Relative number of flies
Purple	175	Few
Light yellow	180	Moderate
Lime green	180	Moderate
Dark yellow	192	Moderate
Orange	225	Moderate
Strawberry red	230	Many
Light red	260	Many
Foil No. 1	375	Abundant
Foil No. 2	700	Abundant

Effect of Color and Foil

Results of experiments conducted are shown in Table I. The data demonstrate conclusively that yellow packages do not repel flies. Flies settled on and specked all nine packages, irrespective of the color wrapper employed. Foil-wrapped packages, contrary to previous opinions, attracted flies. Frequent observations disclosed fewer flies settling on the purple package. In general, more

(*Turn to page* 218)



Packages showing fly specks after a 48-hour exposure to 500 flies in an illuminated Peet-Grady chamber. Left, foil-wrapped package. Right, yellow wrapper applied to package.

Evaluating Screw Conveyors For Materials Handling

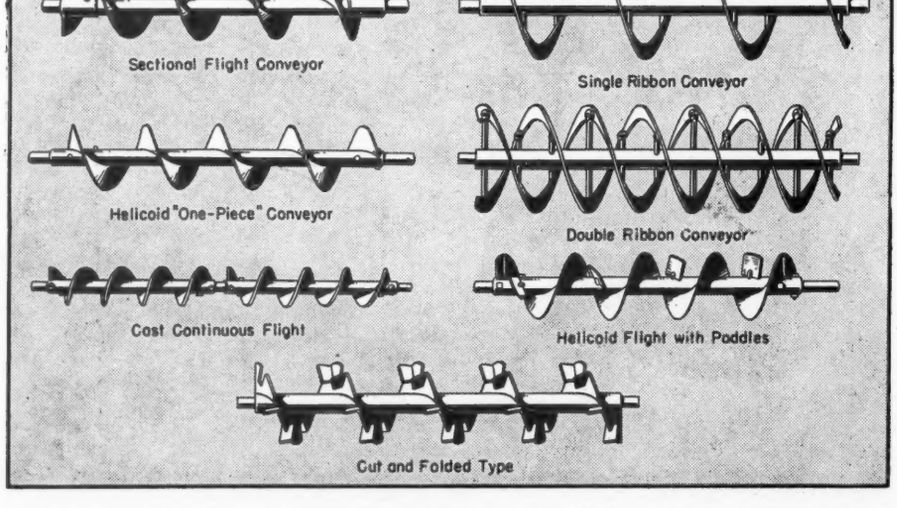
New designs, materials and methods of construction are available for screw conveyors for use in food plants. This article presents engineering data of permanent value on sizes, loads, speeds and power requirements

By D. O. MOCINE, Chicago, Ill.

SCREW CONVEYORS, which date back in history to Archimedes, are to this day the only answer to many materials handling problems. There are numerous individual cases, however, where it is better to use belt conveyors, bucket elevators or bulk movement means. It is intended in this presentation to include information on screw conveyors for all possible uses, including types and capacities, horsepower needed and special adaptations. The data should enable the plant engineer to decide when a screw conveyor should be employed, and to specify the needed equipment. It should be remembered, however, that the manufacturers of conveyor equipment have engineers specializing in materials handling, who are in a position to determine what form of equipment to use if the plant engineer is in doubt, or wishes to have his conclusions confirmed before ordering a conveyor installation.

Some of the limitations of screw conveyor systems will be apparent from the following four examples of installations in food manufacturing plants where difficulty was encountered, necessitating modifications in the equipment or utilization of some other type of conveyor. The illustrations include the handling of flour mixes, baking powder, chewing gum and sugar.

A company, which distributes bulk quantities of prepared flour mixes to hotels, restaurants and small bakeries, was attempting to elevate the component parts of these highly varied flours to a deck about 8 ft. above the floor of the mixing plant by means of a vertical screw conveyor. Difficulty was encountered with the residue of the last batch, left in the length of the screw. It mixed into the next formula to be prepared, resulting in complaints from customers after two different formulas had been used in succession. In an attempt to correct this situation, and at considerable expense in lost time, man-hours and mechanical changes, the casing of the conveyor was fitted with wing-nuts so that the entire length could be cleaned by hand between batches. Material left in the conveyor from the old batch would have to be allowed for in preparing



Types of screw conveyors in common use. Ribbon conveyors are for materials that tend to build up on solid flight conveyors. Paddles are added where mixing in transit is desired.

TABLE I—Relationship Between Lump Size and Conveyor Diameter

Diameter of conveyor (inches)	Maximum lump size of materials (inches) Lumps 20 to 25% of total	Material all in lump form
3	⅜	¼
4	½	¼
6	¾	½
9	1½	¾
10	1½	¾
12	2	1
14	2½	1¼
16	3	1½
18	3	2
20	3½	2
24	3½	2½

TABLE II—Horsepower Required for Standard Pitch, Horizontal Screw Conveyor of Standard Design

$$\text{Horsepower} = \frac{(A\,L\,N) + (C\,W\,L\,F)}{1{,}000{,}000}$$

A: Factor for size of conveyor, as given below
L: Length of conveyor, in feet
N: Speed of conveyor in r.p.m.
C: Quantity of material being conveyed, in cu. ft. per hr.
W: Weight of material, pounds per cu. ft. (See Table III)
F: Factor for material. (See Table III)

Table for Factor "A"

Size of conveyor (inches)	Lignum vitae, babbitt or bronze	Self lubricating bronze	White iron or stellite
3	15	24	36
4	21	33	51
6	33	54	78
9	54	96	132
10	66	114	162
12	96	171	246
14	135	255	345
16	186	336	480
18	240	414	585
20	285	510	705
24	390	690	945
30	549	975	1320

the new batch. A slightly more desirable method would have been to figure the gradation of mixes, if possible, so that the residue from the preceding mix would be allowed for in the one to follow. A better solution of the problem would be the use of elevating means engineered for this type of work, such as an elevator cup or bucket system.

A large factor to be considered in the installation of screw conveyors is chemical or physical change in residue left behind in the system when production is stopped for an extended period. An example of this type of difficulty was experienced by a large manufacturer of baking powder. When some of the chemical constituents of the product were left in the screw during a stoppage (a screw is never totally self-cleaning), they hardened, with the result that if sufficient power were applied when production was resumed, the flights would be sheared from the longitudinal shaft.

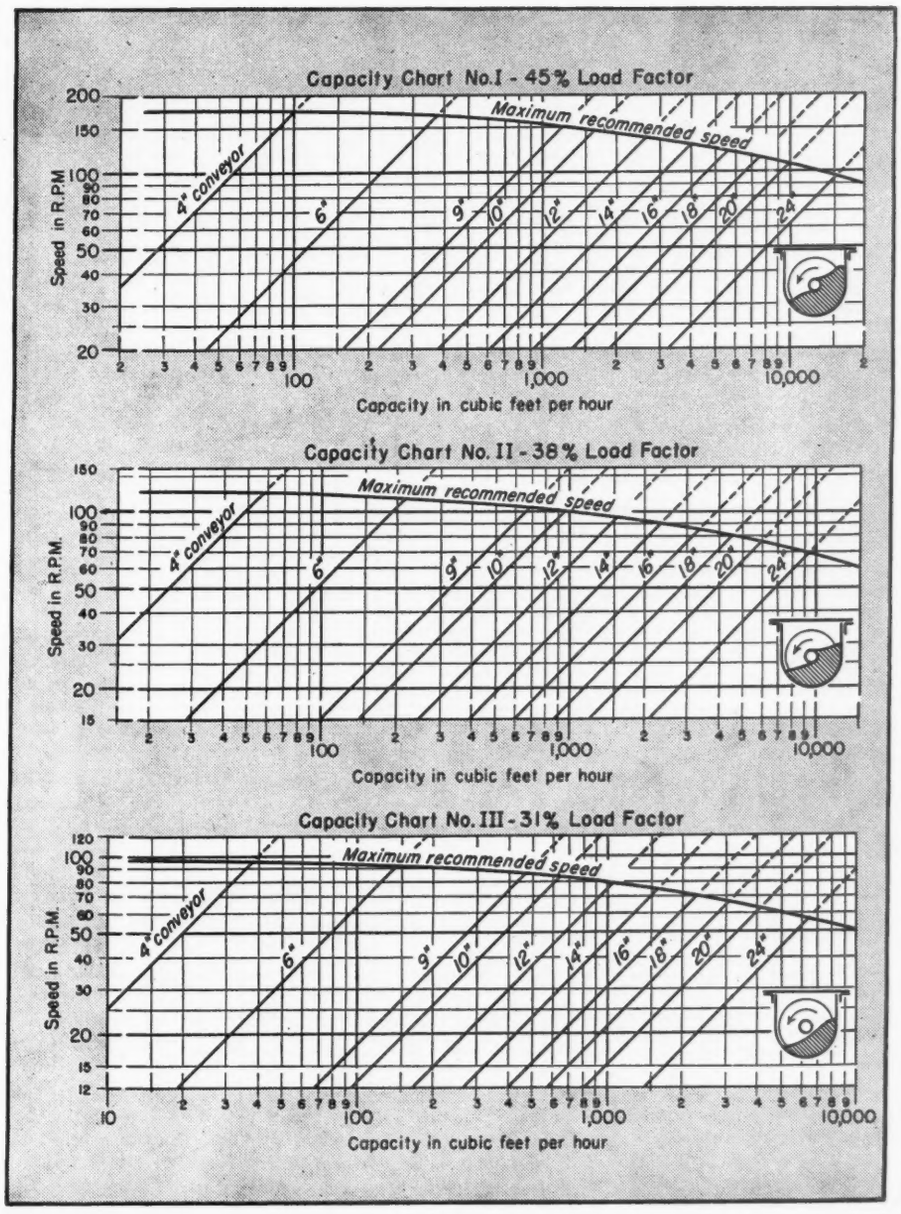
Chewing Gum Problem

A large chewing gum manufacturer got badly "gummed-up" in attempting to use a horizontal screw conveyor for the transfer of chicle from one part of the plant to another. The work done by the revolving screw conveyor built up sufficient heat to melt the basic ingredient of chewing gum, thus stopping the forward movement of the substance and making the screw conveyor impractical for this use. The problem was solved by using a troughed conveyor belt.

In the fourth example of the improper use of this system of materials handling, both the problem and the answer lay in screw conveyors—but of two different types. A large food processing plant had been using a sectional flight conveyor for the moving of sugar, only to find that the crack and rivet holes at the joint of each flight served as a lodging place for sugar, which lumped up. This trouble was satisfactorily corrected with the installation of helicoid continuous-flight welded conveyors. In this plant, the conveyor is now down only once a year and is thoroughly washed in warm water, which readily dissolves any sugar caked on the equipment.

Use of Other Conveyors

It would be possible to cite a great many situations where other materials handling methods solve the problem better than screw conveyors. Likewise, just as many cases could be found where the screw conveyor was the only type to use. The following charts and tables give engineering information on screw conveyors for all possible applications.

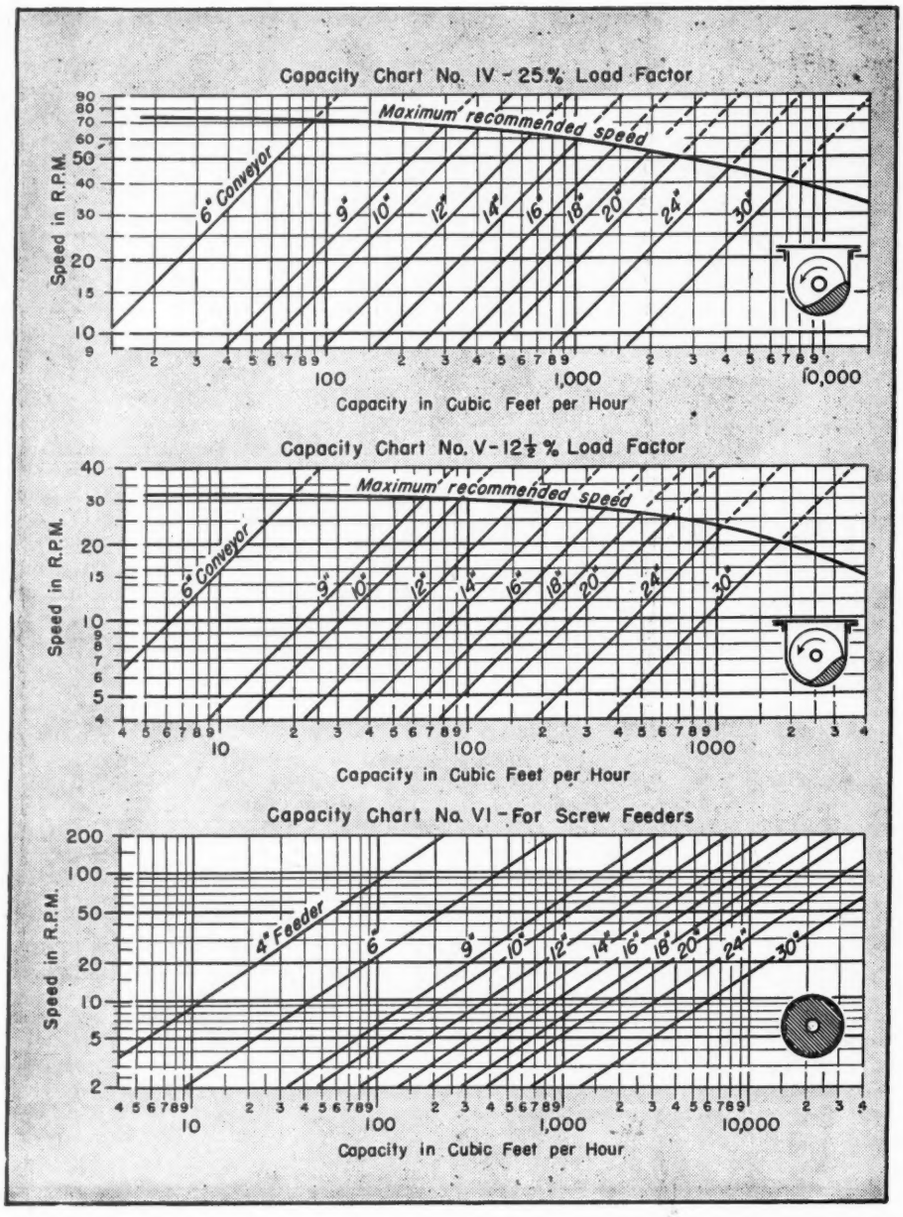


Capacity Charts: Chart I is for fine, light, free-flowing, non-abrasive materials, weighing up to 40 lb. per cu. ft. Chart II is for medium weight, non-abrasive granular or small lump materials weighing up to 50 lb. per cu. ft. Chart III is for non-abrasive granular or semi-abrasive lump materials weighing up to 75 lb. per cu. ft.

Screw Conveyor Types

The sectional flight conveyor is made up of individual flights or turns, each blanked from steel plates and formed into a spiral flight of predetermined diameter and pitch. The standard conveyor is assembled by riveting the flights to each other, and the spiral thus formed is joined to the pipe or shaft by forged steel lugs, or by welding the flight joints and the resultant spiral to the shaft. One chief advantage of the sectional flight conveyor is that individual flights may be replaced when damaged (as frequently happens in the moving of a heavy and abrasive material such as coal) without losing the entire length of the screw.

The helicoid conveyor is made in a special rolling mill by forming a steel bar into a helix, or continuous spiral. This may then be joined to the shaft in either of the two manners mentioned for the sectional flights. The first one-piece, continuous rolled helicoid conveyor flight was patented by the H. W. Caldwell & Son Company in 1898 and was perhaps the greatest advance in the design of the screw conveyor since its first use. The chief advantage of



Capacity Charts: Chart IV is for semi-abrasive or abrasive material consisting of small lumps mixed with fines, weighing up to 100 lb. per cu. ft. Chart V is for highly abrasive or stringy materials. Chart VI is for screw feeders. Screw feeders may operate at from 5 r.p.m. to 200 r.p.m., depending on the purpose for which they are to be used.

this type of screw is that there are no laps or joints, meaning no rivets to shear and fewer places for material to lodge, which is of utmost importance in food plants or in the handling of perishable materials.

The third type of conveyor is made with cast flights. These are frequently used for the handling of acid or hot corrosive materials such as ashes and clinker, zinc ore or wet pulp stocks. Cast screws can be made with extremely heavy flights, capable of resisting high temperatures, and as underfeed screw stokers. In the cast flight conveyor, the shaft and flights are cast in one piece.

Still another form taken by the typical screw conveyor is the ribbon type. The single ribbon has been developed for the handling of such materials as hot tar or asphalt, which has a tendency to build up on a solid flight conveyor. The single ribbon conveyor has nearly the same capacity as a solid flight of the same size. A second ribbon type is the multiple ribbon, whose chief action, while moving the mass forward slowly, is to assure a thorough mixing of the ingredients.

Mixing and chopping of the material in transit is also accomplished by the addition of paddles between the conveyor flights, although the paddles retard the flow. This type is usually reserved for light products. Another type developed for the mixing of material in transit is the cut, or cut and folded type.

A screw may convey either to right or left, regardless of the direction of shaft-rotation, depending on the pitch of the flights. It is possible to make a screw which conveys both right and left from the spout over the center of the shaft. This is done frequently.

Special Metals

Due to the corrosive effect of some materials handled by screw conveyors, particularly in food processing and chemical plants, special screws have been made of bronze, copper, aluminum, monel metal, nickel, silver, and stainless steel of various analyses. Since the cost of a special type of conveyor is much higher than that of a standard type, the question must always be asked whether the economic life of the special conveyor is greater or smaller than the cost of more frequent replacements of the standard type. Does the high first cost of a special metal offset its longer working life? In one instance, where it proved more profitable to use the standard screw, the stream from the discharge end of the conveyor is passed over a magnetic separator in order to make sure that no iron particles pass into the food product being manufactured.

A conveyor of special metal is frequently fabricated in such a way as to facilitate washing or cleaning.

Bearing Types

Standard conveyor sections are regularly assembled in lengths of approximately 8 or 10 ft. in the smaller, lighter sizes; and 12 ft. in the larger, heavier conveyors. Cast flight screws, which are usually quite heavy, are made in shorter lengths.

The screws are supported by hangers at coupling points between the trough ends. The hangers, which fit various styles of conveyor troughs, are fitted with bearings or bushings chosen to suit the materials handled. Selection of the proper type of bearing to be used is important, and is determined by the nature of the material handled, including its abrasiveness, weight per cubic foot, whether free-flowing, wet or dry, and in some cases its bulkiness or maximum lump size. Food products, or other material, which must not be contaminated by oil or grease, may necessitate oilless bushings, self-lubricating bearings of special composition or lignum vitae. In hanger and bearing specifications, the temperature of the substance to be con-

veyed must be taken into account before deciding what to use.

Capacities of Screw Conveyors

Fundamentally, the important factors governing the capacity of screw conveyors are the physical characteristics of the material to be conveyed. The capacity charts (I to VI), reproduced through courtesy of Screw Conveyor Dept., Link-Belt Company, Chicago, Ill., are based on these physical characteristics.

Capacity Chart I, with an average cross-section load factor of 45 percent, has been formulated for light, fine, free-flowing and non-abrasive materials weighing up to 40 lb. per cu. ft. Materials handled under this classification should be similar in physical characteristics to flour, corn meal, pulverized coal or air-separated hydrated lime, that will flow freely around the hanger bearing.

Capacity Chart II, with an average cross-section load factor of 38 percent, has been formulated for medium weight, non-abrasive, granular or small lump materials weighing up to 50 lb. per cu. ft. Under this classification come such materials as small grains, sawdust and cottonseed.

Capacity Chart III, with an average cross-section load factor of 31 percent, is for non-abrasive or semi-abrasive granular or small lump materials weighing up to 75 lb. per cu. ft. In this category fall such materials as wet malt, coarse salt, refined sugar, ground tanbark, bituminous coal or screenings.

Capacity Chart IV, with an average cross-sectional load factor of 25 percent, is for semi-abrasive or abrasive material, consisting of small lumps mixed with fines, weighing up to 100 lb. per cu. ft., such as cement, gypsum, crushed bones, ground or pebble lime. Load level in the conveyor should be kept well below the hanger bearings, as the substances are abrasive or pack readily.

Capacity Chart V, with an average cross-sectional load factor of 12½ percent, has been formulated for materials that are highly abrasive or stringy, which must be carried at a

(*Turn to page* 222)

TABLE III—Material Table for Screw Conveyors

Average Weights, Capacity Chart Classifications, Bearings and Couplings, and Factor for Horsepower Formula

Based on Link-Belt Company's Screw Conveyor Data Book No. 1289

Material	Weight per cu. ft. lb.	* Capacity chart	+ Recommended brgs. and Couplings	H.P. factor "F"
Alum, lumpy	50- 60	III	B(a)	1.4
Alum, pulverized	45- 50	II	B(a)	.6
Ashes, dry	35- 40	V	I	4.0
Ashes, wet	45- 50	V	I	5.0
Baking powder	50- 55	II	W	.6
Barley	38	I	B	.4
Beans	48	II	B	.4
Beans, castor	36	IV	B	.5
Bones, crushed	35- 40	IV	I	2.0
Bone black	20- 25	IV	I	1.7
Bone meal	55- 60	IV	I	1.7
Bran	16	I	B	.4
Brewer's grain, spent, wet.	55- 60	III	B	.6
Brewer's grain, spent, dried	25- 30	I	B	.4
Buckwheat	42	I	B	.4
Cement, portland	75- 85	IV	I	1.4
Chalk, crushed	85- 90	IV	I	1.9
Chalk, pulverized	70- 75	IV	I	1.4
Charcoal	18- 28(e)	III	B	1.4
Coal, fines or slack	40- 45	II	B	.9
Coal, pulverized	32- 35	I	B	.6
Coal, sized	45- 50	III	B	1.0
Coal, lignite	45- 55	III	B	1.0
Cocoa	30- 35	III	W	.9
Cocoa beans	35- 40	II	B	.4
Coffee	40- 42	II	W	.4
Cork, ground	12	III	B	.5
Corn, shelled	45	II	B	.4
Corn grits	42- 43	II	B	.5
Corn meal	40	I	B	.4
Cottonseed, dry	25	III(b)	B	.9
Cottonseed cake, cracked	40- 45	III	B	1.0
Cottonseed hulls	12	II	B	.9
Cottonseed meal	35- 40	I	B	.4
Cottonseed meats, dry	45- 50	II	B	.6
Cottonseed meats, rolled	35- 40	II	B	.6
Flaxseed	45	I	B	.4
Flaxseed cake	48- 50	II	B	1.6
Flaxseed meal	25	I	B	.4
Flour, wheat	35- 40	I	B	.6
Fluorspar	110	IV	I	2.0
Fullers earth, raw	35- 40	IV	I	2.0
Fullers earth, spent, 35% oil	60- 65	IV	I	2.0
Gelatin, granulated	32	II	W	.8
Gypsum, calcined	55- 60	III	I	1.2
Hominy	37	I	B	.4
Lard	59	III	W	.4
Lime, ground (unslaked)	60	III	B(c)	.6
Lime, hydrated	35- 45	II	B(c)	.8
Lime, hydrated, pulverized and air separated	32- 40	I	B(c)	.6
Linseed cake, pea size	48- 50	II	B	.6
Linseed, meal	44	I	B	.4
Malt, dry, crushed	20- 22	I	B	.4
Malt, dry, whole	27- 30	I	B	.4
Malt, wet or green	60- 65	III	B	.4
Malt meal	36- 40	I	B	.4
Milk, dried, flake	36	III	W	1.0
Milk, malted	27	III	W	.9
Oats	26	I	B	.4
Peanuts, shelled	20-25	IV	B	.5
Peanuts, unshelled	15-20	IV	B	.7
Phosphate, acid, pulverized, 6% to 8% moisture	60	IV	I	1.4
Phosphate, granular	90	IV	I	1.6
Rice, clean	45- 48	I	B	.4
Rice grits	42- 45	I	B	.4
Rye	44	I	B	.4
Salt, coarse	45- 51	III	B(c)	1.2
Salt, dry fines	70- 80	III	B(c)	1.0
Sand, dry	90-110	IV	I	2.0
Sand, silica, dry	90-100	V	I	2.0
Sawdust	13	III	B	.7
Shavings, wood	15	III	B	1.0
Soap, powdered	20- 25	III	B	.9
Soda ash, dense	55- 65	III	I	.7
Soda ash, light	20- 35(e)	III	I	.7
Starch	45	III	B	1.0
Sugar, raw	55- 65	IV	B	1.0
Sugar, refined	50- 55	III	W	.7
Sugar beet pulp, dry	12- 15	III	B	.9
Sugar beet pulp, wet	25- 45(e)	III	B	.9
Sulphur, lumpy	80- 85	IV	B	.8
Sulphur, powdered	50- 60	IV	B	.7
Tanbark ground	55	III	B	.7
Tankage	60- 62	III	B	.6
Wheat	48	I	B	.4

*The capacity Charts I to V, inclusive, are based on using standard hangers.

+Symbols for hanger bearings and couplings:

B—Grease lubricated, babbitted or bronze bearings with cold rolled steel couplings.

SL—Self-lubricated bronze bearings and cold rolled steel couplings.

W—Arguto, hard maple or lignum vitae bearings, self-lubricating or oil impregnated. Cold rolled steel couplings.

I—White iron bearings (usually non-lubricated) with hardened steel couplings. Stellite-bushed bearings or hardened steel bearings may also be used. Manganese steel bearings or couplings are sometimes specified.

(a)—Wood bearings are substituted where contamination of the product must be avoided.

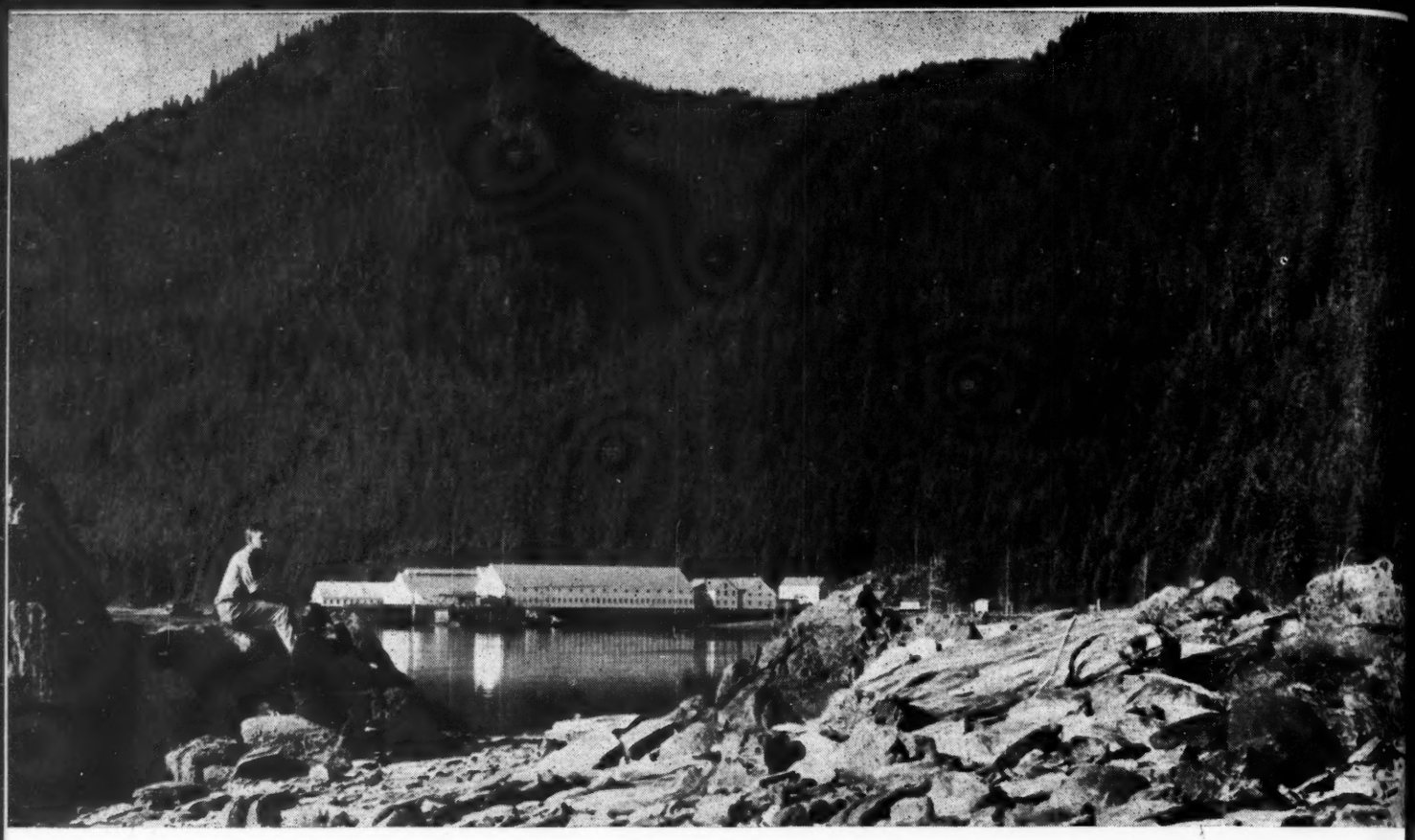
(b)—The operating speeds as recommended in Chart III should not be used when handling cottonseed as screw conveyors can be operated approximately 75% faster than the maximum shown.

(c)—If white iron bearings (non-lubricated) are preferred, increase horsepower factor.

(d)—Open side hangers are recommended. It may be necessary to step down to Capacity Chart IV or V if other style hangers are specified.

(e)—The wide variations shown in weight are due to moisture content or conditions of materials as produced to commercial specifications.

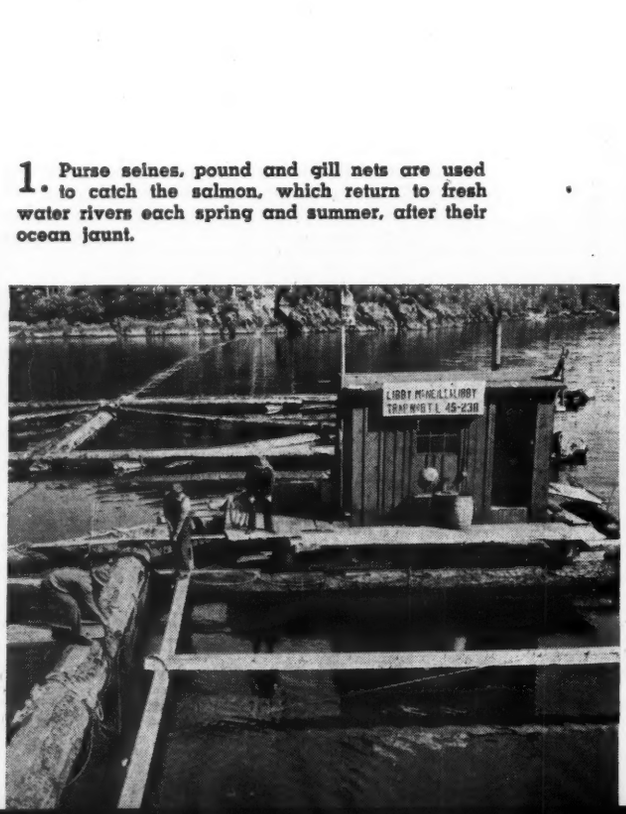
Molded textile fabric bearings may be used where water lubrication is permissible. On some installations, these bearings can be operated without lubrication. Extreme care should be used in specifying such bearings, as phenol resinoids are present.



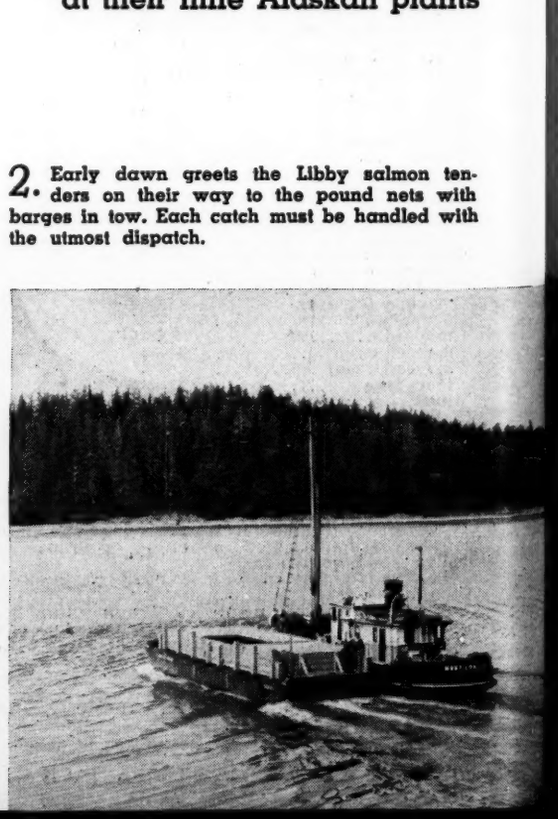
SALMON CANNING

The string of isolated canneries lining the 26,000 mile coast of Alaska produces a large part of the salmon canned commercially in the world, today. Here is Libby, McNeill & Libby's own story of the operation at their nine Alaskan plants

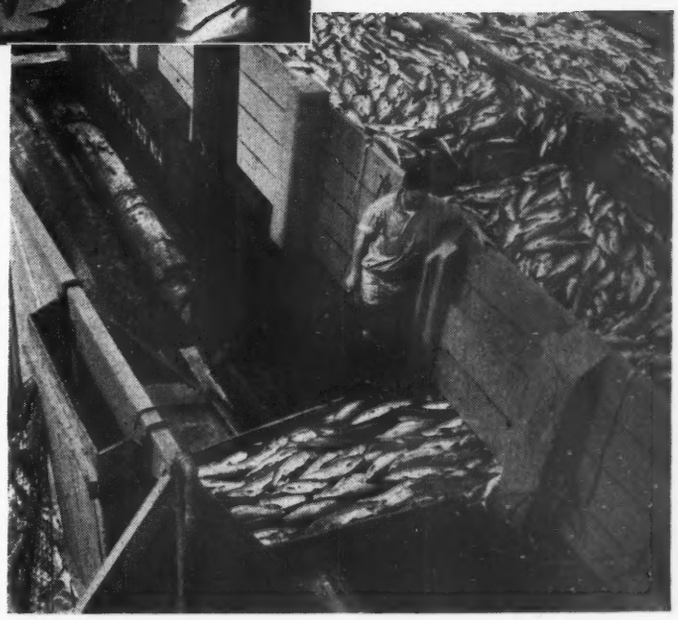
1. Purse seines, pound and gill nets are used to catch the salmon, which return to fresh water rivers each spring and summer, after their ocean jaunt.



2. Early dawn greets the Libby salmon tenders on their way to the pound nets with barges in tow. Each catch must be handled with the utmost dispatch.



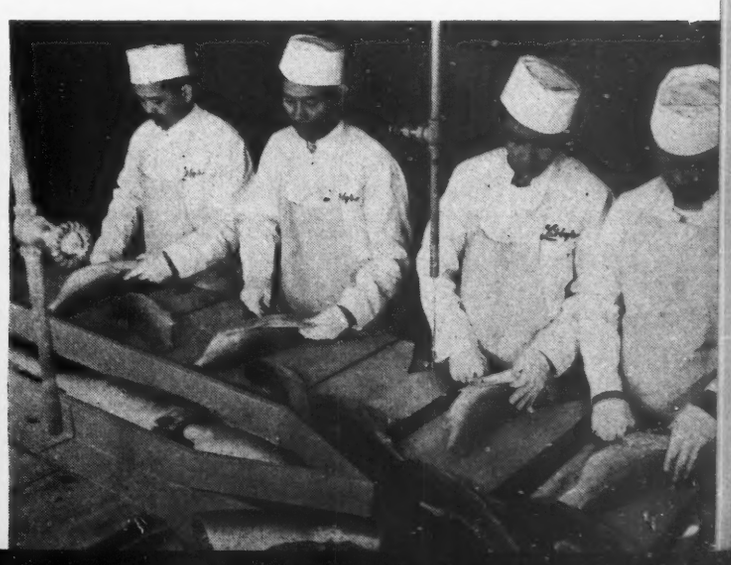
3. The silvery salmon, taken in a pound net, are next dumped into a barge, which, when filled, is towed at once to a nearby cannery. A radiophone from the Libby tenders warns the cannery of the impending arrival of the fresh catch of fish.



4. When the catch reaches the plant, all is in readiness to sluice the salmon from the barge into the cannery, where experts select the most choice specimens for the Libby label. A gravity flume then speeds the fish to the cleaning machine.

5. The cleaning machine automatically removes the head, tail and fins, and splits open and dresses the body cavity, at the rate of 70 to 80 fish per minute.

6. The dressed salmon emerge from the cleaning machine and are given a thorough inspection. Each fish is washed and examined inside and out in preparation for canning.

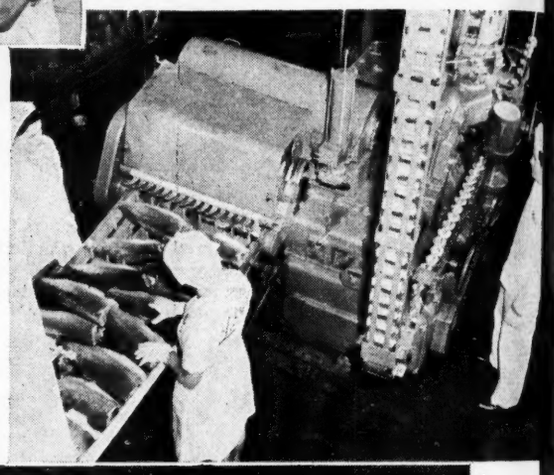


SALMON was being canned as long ago as 1819 along the Atlantic Coast, and by 1864, the industry had moved to the West Coast. It was not until 1878, however, that the first cannery was established in Alaska. And the years since then have been marked by the many hardships that, even today, attend the shipping of materials and supplies to the isolated plant locations in this far north region.

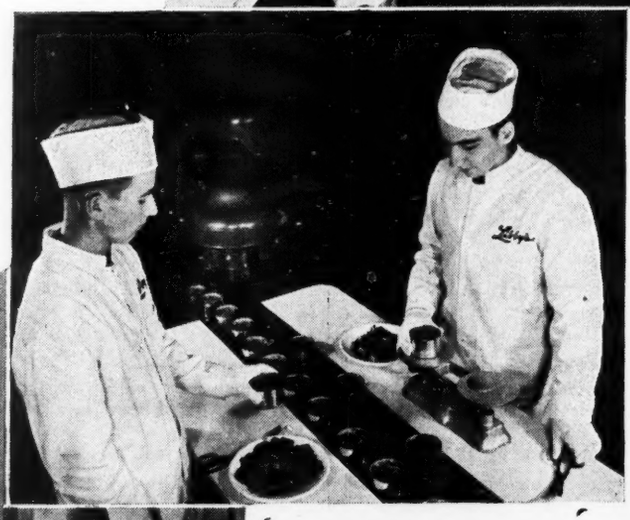
The first of the nine canneries owned by Libby, McNeill & Libby began operations in 1912. To supply these canneries, all materials needed during the entire packing season must be carried up from Seattle by boat in the early spring. The men and supplies make the trip in modern ships, which take from seven to nine days. Enough items to furnish a good sized town must be purchased and packed aboard these ships. Included are nets, flattened cans and can ends, machinery parts, labels, shipping cases, fuel, clothing, foodstuffs, medicines, and a great variety of other articles. The omission of even the smallest items might interfere with operations.

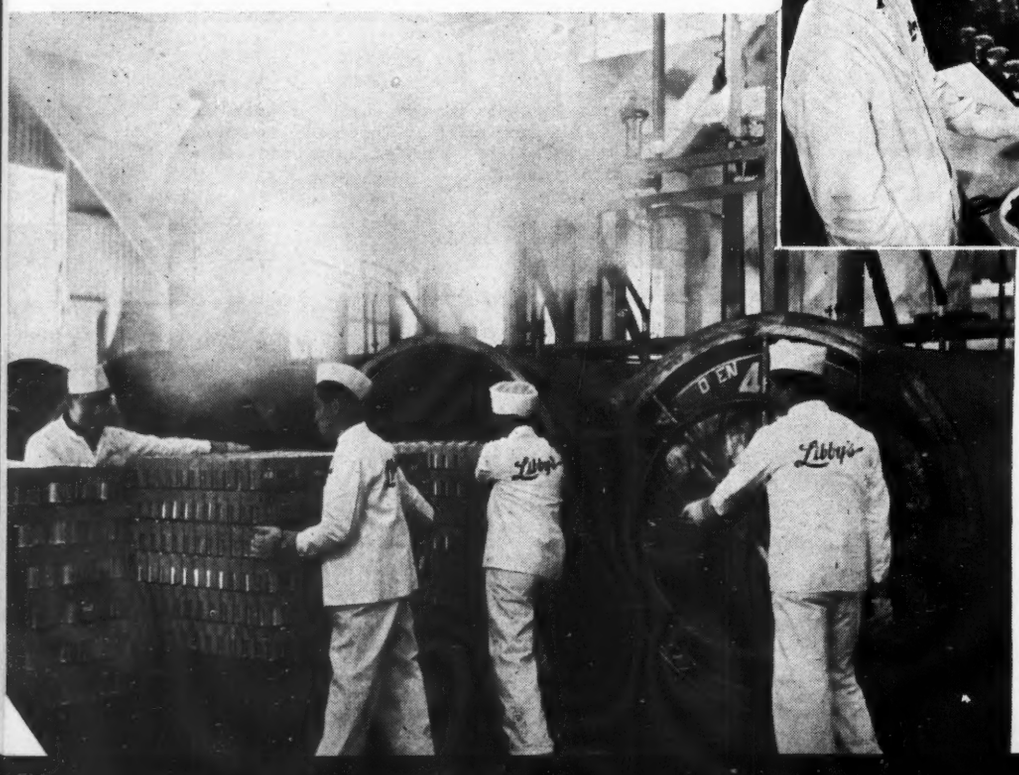
When the men and their supplies arrive at the cannery sites, the plants are opened, the machinery is inspected, the small fishing craft are launched and the nets are inspected and repaired. Everything is put into working condition and in readiness for the official opening of the fishing season—a date specified by the Fish and Wildlife Service of the U.S. Department of the Interior. And then the work begins in earnest.

7. The cans, which were pressed flat to conserve shipping space, are sent through this machine for reshaping and to have their bottoms fastened on. They are now ready for filling with salmon as soon as the preparation of the fish has been completed.



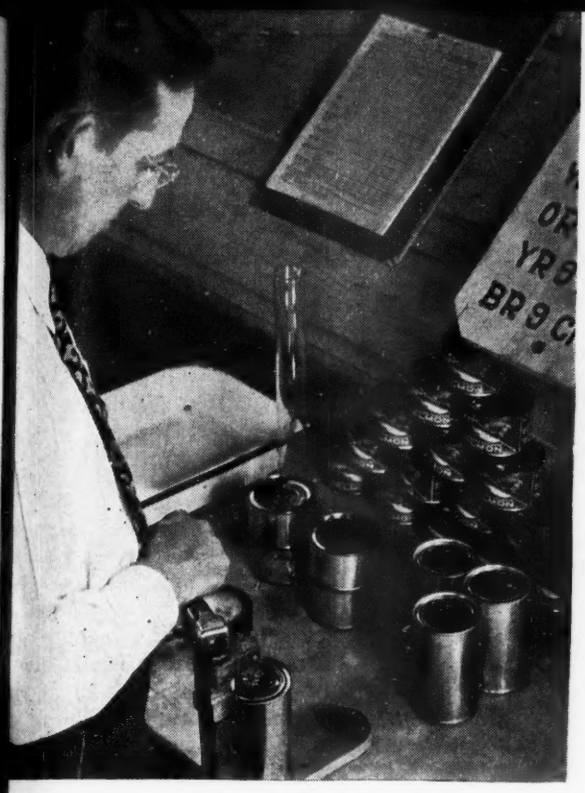
8. Meanwhile, the selected salmon have been given another inspection and are here being fed into a machine that cuts each fish transversely into slices of just the proper size to fill the can. Nothing is added to the salmon but a dash of salt to bring out the flavor.





9. The final check is shown above, as filled cans move slowly along a conveyor belt. Inspectors make sure that each can contains its full measure. The cans are then vacuum sealed by machine, placed on trucks and wheeled to the cookers.

10. The loaded trucks are rolled into the cooking retorts and the temperature raised to 240 deg. F. The salmon is cooked here thoroughly and completely sterilized. The cans are then washed, cooled and made ready for final checking and



11. The pack has to be checked by the laboratory and certified top grade before the label is applied. At the left, sample cans are being opened for inspection and checking against Libby's standards. This is the final operation before labeling and plays an important part in quality control.

12. After certification, the cans are labeled by machine at right, after which they are placed in cartons and put aboard coastal steamers for their long journey to the salmon markets of the U. S. and throughout the world.

13. In the shadow of totem poles and with the aid of many native Alaskan fishermen and cannery workers, Libby's packs millions of cans of choice salmon, a fish that is rich in protein, calcium, phosphorus and iodine, as well as vitamin D.

Using DDT for Fly Control

When properly applied, DDT will reduce fly and roach population by as much as 95 percent. Instructions for preparing DDT for different uses are given together with suggested methods of application in various parts of food processing plants

By LESLIE A. SANDHOLZER and J. M. LEMON, U. S. Department of the Interior
Fish and Wildlife Service, Division of Commercial Fisheries

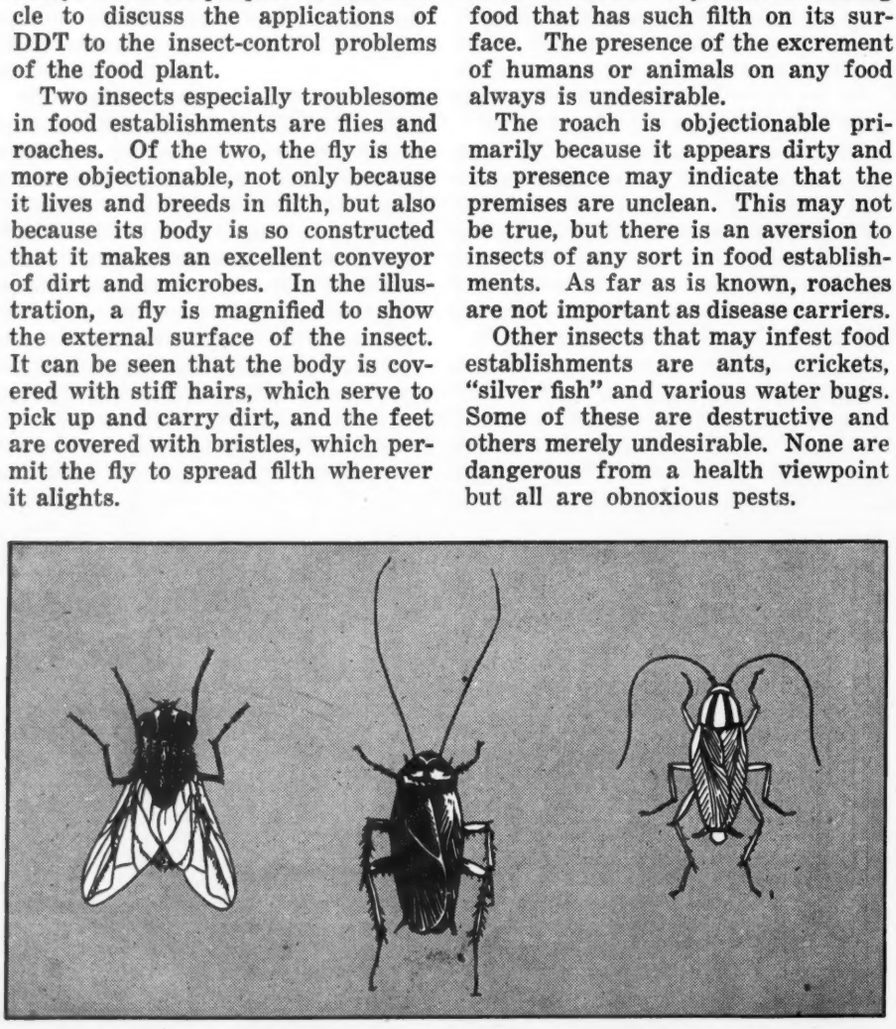
AS soon as DDT became available for civilian use, the Division of Commercial Fisheries of the U. S. Fish and Wildlife Service, in cooperation with the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture began work to determine its usefulness in the fisheries. Principles developed from these experiments can be applied to any branch of the food industy. It is the purpose of this article to discuss the applications of DDT to the insect-control problems of the food plant.

Two insects especially troublesome in food establishments are flies and roaches. Of the two, the fly is the more objectionable, not only because it lives and breeds in filth, but also because its body is so constructed that it makes an excellent conveyor of dirt and microbes. In the illustration, a fly is magnified to show the external surface of the insect. It can be seen that the body is covered with stiff hairs, which serve to pick up and carry dirt, and the feet are covered with bristles, which permit the fly to spread filth wherever it alights.

Even before the age of bacteriology, it was recognized that this insect was associated with outbreaks of certain diseases, especially those which we now know are food-borne, such as typhoid fever. Recent observations in a certain city indicated that the majority of flies found there originated in the raw sewage at the disposal plant. Even if these insects did not carry disease germs, there is an aesthetic objection to eating food that has such filth on its surface. The presence of the excrement of humans or animals on any food always is undesirable.

The roach is objectionable primarily because it appears dirty and its presence may indicate that the premises are unclean. This may not be true, but there is an aversion to insects of any sort in food establishments. As far as is known, roaches are not important as disease carriers.

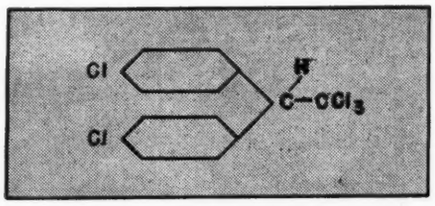
Other insects that may infest food establishments are ants, crickets, "silver fish" and various water bugs. Some of these are destructive and others merely undesirable. None are dangerous from a health viewpoint but all are obnoxious pests.



(Left) The housefly. Note the hairy structure of the body and hairs on the legs. These make ideal carriers for filth. (Center) The American cockroach. (Right) The German cockroach.

Formulas and Technics

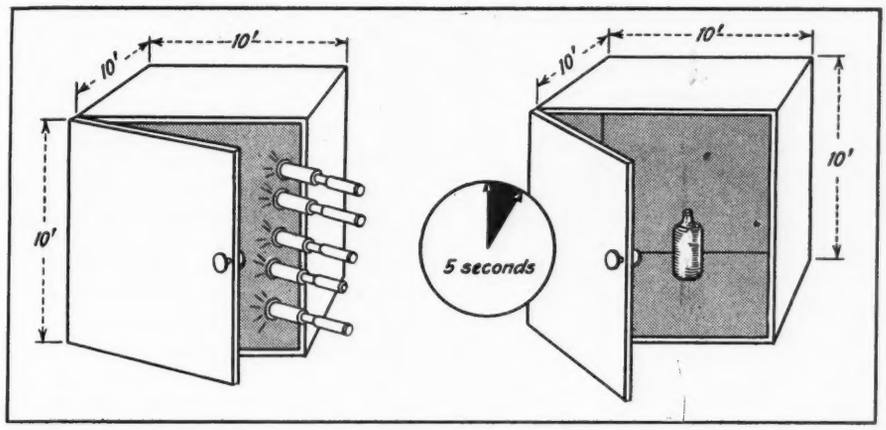
"DDT" is an abbreviation for dichlorodiphenyl-trichloro ethane. The official chemical designation is 2, 2 bis (*p*-chlorophenyl), 1, 1, 1-trichloroethane and its structural formula is



Pure DDT is a white crystalline substance. It has a melting point of 224 to 226 deg. F. The commercial product is a grayish powder that melts at a lower point than this. Most specifications call for a setting point of 190 deg. F. It is insoluble in water but can be dissolved in various oils and other organic solvents. (Table 1.) Under ordinary circumstances DDT is a stable substance.

In the insecticidal treatment of food establishments, two types of controlled application have been employed. One consists of applying DDT preparations to the walls, ceilings and base boards, with the object of obtaining an enduring insecticidal effect. This type of application is known as a "residual" spray. The other is called a "space" spray. This consists of filling an enclosed space with a fine particle mist of the insecticide, which eliminates adult insects present at the time of spraying. Residual sprays may remain effective for months under ordinary conditions but space sprays lose their effectiveness after several hours.

The basic constituent of all DDT sprays is the commercial powder, usually dissolved in oil or some other organic solvent. Special preparations are available, which can be used in powder form or as water suspensions. When used in solution or as



Space spraying. When using the aerosol bomb open the valve for 5 seconds for each 1,000 sq. ft. of space. When using the hand applicator, 5 strokes are required for each 1,000 sq. ft. of space.

a water emulsion or suspension, the usual concentration employed is 5 percent. The powder usually contains 10 percent in an inert base. The aerosol bomb used in space spraying contains three percent DDT in a special solvent. The concentrated spray, used for the same purpose, contains 20 percent.

Residual Sprays

Residual spraying can be accomplished best with a pressure type of sprayer, although if nothing else is available, the ordinary type of household sprayer can be employed. The common pressure garden sprayer can be used successfully but has several defects. The construction is usually insufficiently rugged for continued use. The rubber washers and hose are not chemically resistant and disintegrate rapidly with oil solutions. The most satisfactory sprayer is a decontamination device designed for the army. This is built for hard use and is equipped with chemically resistant rubber fittings. A variety of nozzles are available, which make it more versatile than the garden sprayer. Where residual applications are made with DDT dust, the ordinary garden duster or "puff gun" is satisfactory.

Five percent DDT as a solution, emulsion, or suspension is usually applied at a rate of 1 gal. per 1,000 sq. ft. To conserve insecticide, screens can be painted with the preparation. Listed below are the formulas for the common residual spray mixtures.

1. Solutions in kerosene or other oils. These mixtures are made by dissolving 7 oz. DDT (technical) in 1 gal. solvent.

In practice, 2 lb. of dry DDT are dissolved in 5 gal. of solvent. Such solutions are not easily prepared. It is best first to prepare a uniform sludge of the DDT in a small amount of the oil. This is then added to the remainder of the solvent with agitation. Permitting the mixture to stand at room temperature for several hours, followed by agitation or stirring, usually yields a satisfactory product.

2. DDT concentrate for water emulsion. Concentrate can be made by dissolving 25 parts DDT (technical) with 10 parts emulsifier (Triton-X-100) in 65 parts solvent (xylene).

To make a 5 percent water emulsion, add one part of concentrate to four parts of water. Seawater, as well a fresh water, may be used. The emulsion is milky white and is stable for several hours. If left standing for any length of time, it should be stirred prior to use. Although the concentrate is inflammable, there is no fire hazard with the emulsion.

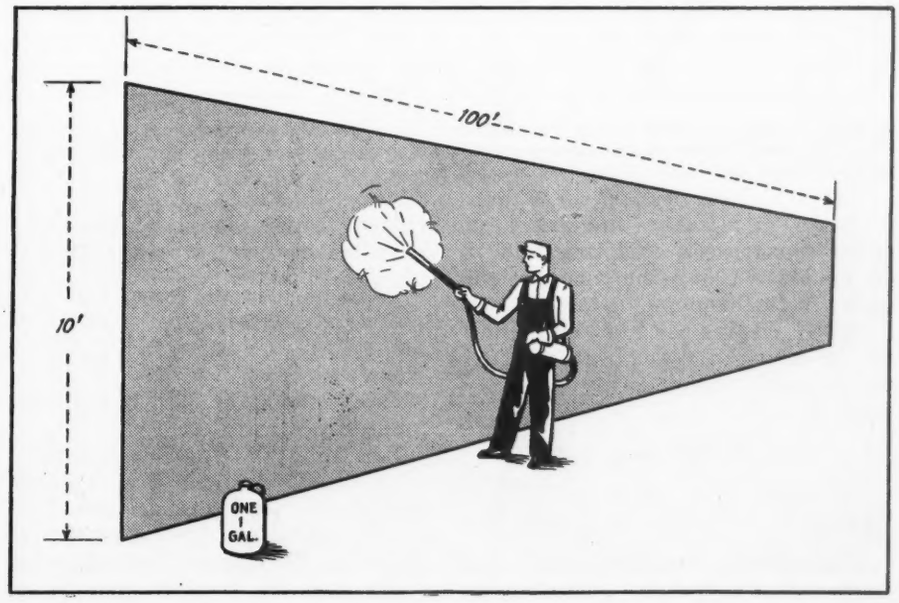
3. Dispersible DDT for water suspension. A mixture containing 50 percent DDT and a wetting agent is available for making water suspensions. Four pounds of this powder are mixed with 5 gal. of water to make a 5 percent suspension. A better product containing 90 percent DDT has also been employed, but is not yet available commercially. Ordinary technical DDT cannot be used for making suspensions.

Suspensions made from these dispersible powders are not as stable as the emulsion and require almost continual agitation during spraying. They have the advantage, however, of being free of odor and fire hazard.

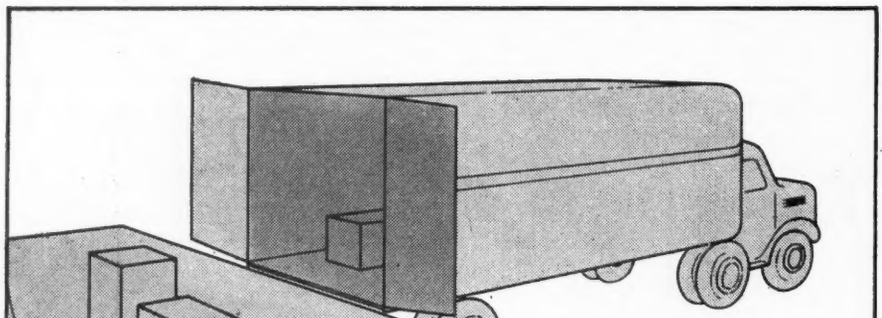
4. Dusting powder. This product contains 10 percent DDT in talc or some other inert dry base. It is used as a dust in the form in which it is purchased. It cannot be employed as an emulsion or suspension.

Space Spraying

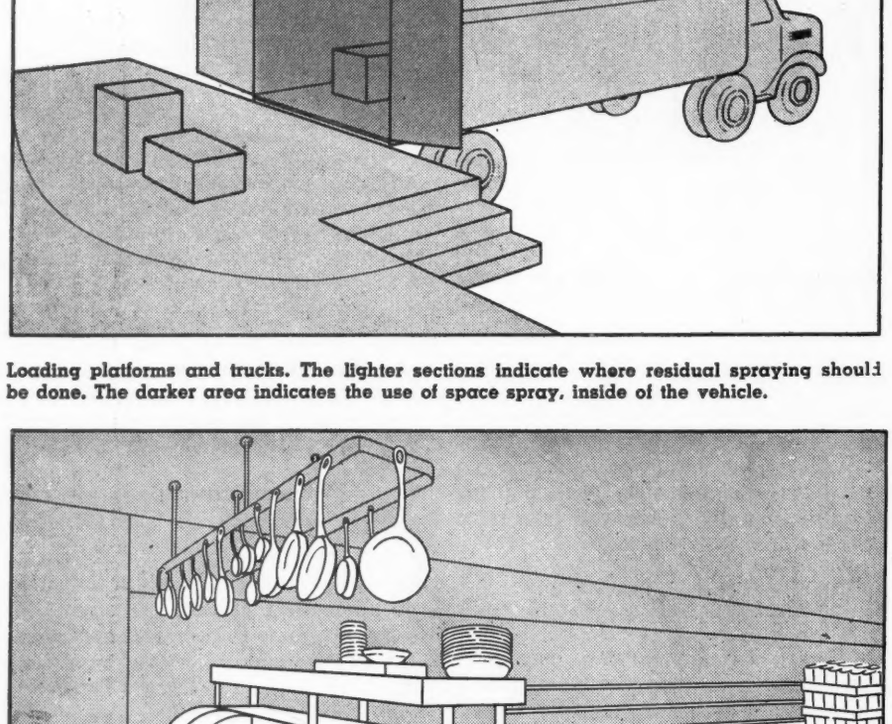
Space spraying is accomplished with either the aerosol bomb or with a special hand sprayer developed at the laboratory of the Bureau of Entomology and Plant Quarantine at Orlando, Florida. This latter device offers an advantage over the aerosol bomb in that directional control of the spray may be obtained to a limited degree, and less insecticide is usually employed because of the high concentration of insecticidal ingredients in the spray. In food establishments these advantages are desirable because contamination of exposed food products is less likely. When using the aerosol bomb, the insecticide is released for 5 sec. per



Residual spraying. Use 1 gal. of 5 percent DDT solution or emulsion for every 1,000 sq. ft. of surface.



Loading platforms and trucks. The lighter sections indicate where residual spraying should be done. The darker area indicates the use of space spray, inside of the vehicle.



Kitchens. Residual sprays should be applied to the walls and ceilings (dark areas). Care should be taken to protect the cooking utensils and food. DDT dust should be applied around sinks, cabinets and baseboards if cockroaches are present.

1,000 cu. ft. If there are drafts or large open spaces, this time should be doubled. Using the concentrated spray in the hand applicator requires about 10 strokes per 1,000 cu. ft. As in the case of the bomb, this should be increased where conditions warrant it.

Aerosol Bomb

DDT (technical)	3 percent
Pyrethrum	2 percent
APS-202 (solvent)	15 percent
Freon	80 percent

These bombs are filled at the factory and are operated according to directions printed on them. Some types are refillable at the factory, whereas others must be discarded when the contents are exhausted.

Concentrated Spray

DDT (technical)	20 percent
APS-202	40 percent
Pyrethrum	15 percent
Kerosene	25 percent

This is the spray used in the hand applicator.

Two things must be borne in mind when considering the best methods of applying DDT to food establishments. These are the possibility of imparting off-flavors or odors to foods and the possible toxicity to humans of DDT residues on exposed foods. In regard to the former, it is well to avoid sprays in solvents that are known to alter food flavors. Crude kerosene solutions should not be used, even though they are the least expensive of the sprays. The material of choice is the water suspension. Where foods are packaged or otherwise protected, the water emulsion may be used, since the xylene volatilizes rapidly. Exposed fatty or oily foods, however, might be ruined with this spray.

Regarding the toxicity of DDT for humans, Dr. F. C. Bishopp[1] of the U. S. Department of Agriculture says:

"It should be pointed out that the circumstances under which DDT has been developed have led to the most critical examination of the toxicology of DDT to which any insecticide has been subjected. Furthermore, because of the publicity given to DDT and the precautions that should attend its use the public is prone to attribute to it any illness or other ill effects that can be associated even remotely with its use. Witness several cases of human illness and death reported as DDT poisoning all of which upon thorough investigation by Dr. Paul A. Neal of the National Institute of Health have been found erroneous. As a matter of fact, Dr. Neal has pointed out that no instance has been found in which a person has been poisoned from the use of DDT itself in insect control operations."

Dr. Bishopp also points out that joint investigations by the National Institute of Health, the U. S. Food and Drug Administration and his own organization have shown that DDT is poisonous to warm blooded animals when ingested or absorbed through the skin in considerable quantities in the form of oil solutions. Its acute and subacute toxicity to higher animals is markedly less than that of many materials commonly used as insecticides. DDT has no appreciable sensitizing action, and the use of powders or water dispersible material on the skin is without irritating or other ill effects. There is little danger, if any, to the consumer who eats food from an establishment where DDT is used for the control of insects.

Preparation for DDT Treatment

The success of an application in a food establishment is dependent upon the care with which the plant is prepared for spraying. Failures that have been reported are due largely to a disregard of basic considerations. The following are pre-

[1]Address given at National Canners Association Convention in Atlantic City, N. J., February 5, 1946.

TABLE 1—Solubility of DDT

Solvent	Lb. DDT per gal.
Cyclohexanone	9.7
Isophorone	6.2
Mesityl oxide	5.4
O-dichlorobenzene	5.0
Tetrahydronaphthalene	5.1
Xylene	4.4
Solvesso No. 3	3.7
Velsicol AR-40	4.9
Hi-Flash solvent	4.0
Sovasol-74	3.5
PD 544-C	3.7
Velsicol AR-50	4.6
Velsicol AR-60	4.8
Heavy solvent	4.8
PD 544-B	3.8

liminary steps that should be taken before any DDT is used in the plant.

1. All fly-breeding situations in the plant and its immediate vicinity must be eliminated. These can be located by watching for adult fly emergence from refuse and garbage dumps, offal and other wastes in receptacles, under platforms or latrines. Elimination of breeding places will greatly aid control measures. If flies breed and emerge faster than DDT can kill them, material waste results.

2. Window and door screens should be kept in good repair and kept in use. DDT does not keep flies or other insects out. It merely kills them slowly when they make contact with it. Open, unscreened windows serve as invitations for insects to enter. They do not act as escapes for those already inside the plant. Failure to use screens properly may mean failure of the DDT application.

3. The plant must be clean before DDT can be used effectively. Filth on the walls or screens will tend to reduce the insecticidal effectiveness. It also serves as an attraction for insects and thereby increases the numbers to be eliminated.

4. All surfaces that are to be sprayed should be dry before applying DDT. Condensation moisture on the walls or ceiling, or hosing down these surfaces just prior to spraying may prevent the proper distribution of the insecticide and will interfere with its adhesiveness.

5. To protect the consumer from any possible effects of DDT, cover all exposed food, utensils, etc., before spraying. This can be accomplished by adequately covering such materials with heavy wrapping paper.

Type of Treatment

Where flies are present only in small numbers (10 to 25 flies per room) a fly swatter is probably as efficient as and less expensive than DDT. Where flies are a continual nuisance, however, or are present in large numbers, a residual spray is the most effective, if conditions permit its use. This method is also best for roach control. Where a residual spray is undesirable, space sprays should be used. Frequently a combination of the two methods can be used effectively. Specific recommendations for food establishments are given below.

Vehicles: Trucks and other vehicles employed for the transportation of food frequently attract flies and may be infested with roaches. Since it is not desirable to have food come into direct contact with DDT, it is recommended that just prior to loading, closed trucks and box cars be space-sprayed. This will eliminate insects already inside and will reduce the numbers that enter during loading. The outside of the vehicle should be given a residual spray to kill any insects which may alight upon it.

Loading Platforms: Concrete or wooden loading platforms should be given periodic treatment using a 5 percent kerosene solution. After the platform has been freed of freight, it should be swept clean and if necessary washed with a hose. When dry, the entire platform, not merely the loading surface, and the adjacent street area for about 5 ft. should be sprayed. Because of the continuous use of such platforms, the weather and the frequent cleaning, the spray should be applied each week during warm weather.

Open Sheds: The most effective control of flies and other insect pests in open sheds is obtained with a residual spray. The under surface of the roof, the posts and other supporting structures should be thoroughly sprayed with a five percent kerosene solution at some time when the shed is empty. Particular attention should be given to cross beams, light cords and pipes, since flies tend to settle on these structures. Because the inside is protected from the weather, a single spraying should remain effective for several months.

The entire floor area should be sprayed with the same solution at least once each week during warm weather. DDT dust can be sprinkled behind and beneath platforms to kill roaches but care should be taken to protect food from it.

Sidewalks and gutters in the immediate vicinity should be periodically sprayed with the kerosene so-

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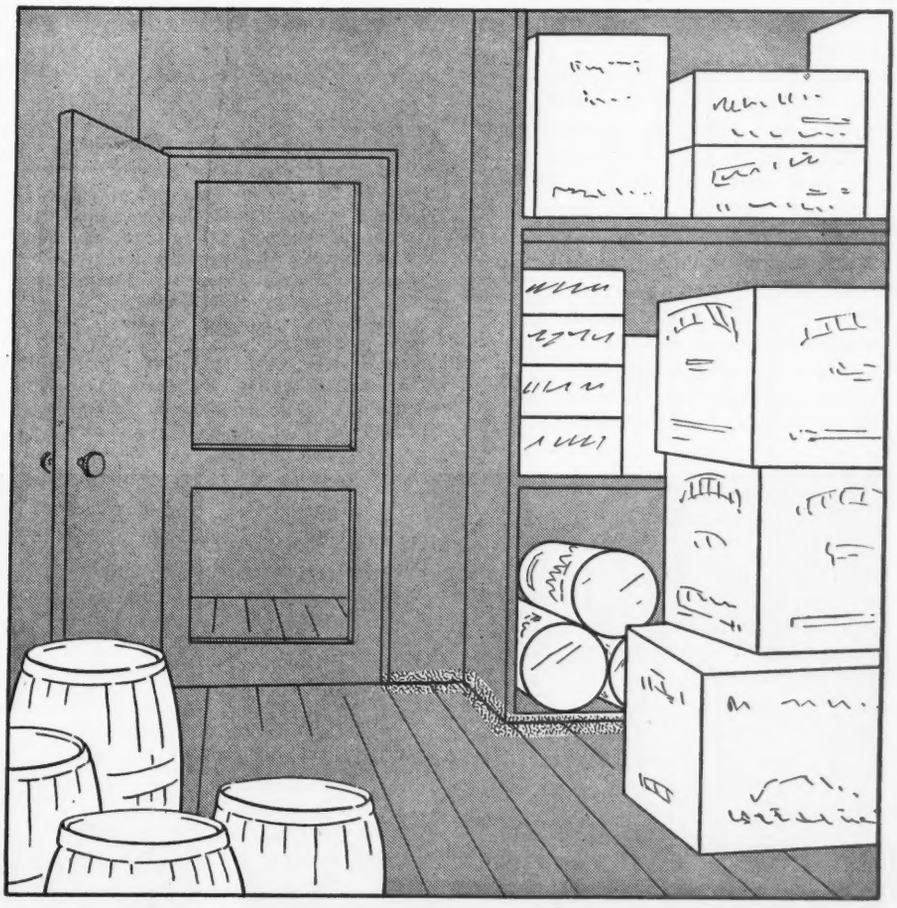


Store Rooms. The darker areas indicate where residual spraying should be done. This includes walls, screens on doors and windows, and floor. DDT dust should be applied at the base of shelves and baseboards.

High Frequency Heating Produces Mold-Free Bread

Growth of mold in wrapped sliced bread of all types, including Boston brown and whole wheat bread, is prevented by through-heating with high frequency current. Electronic heating can be used also for refreshing stale bread

By W. H. CATHCART, National Bakery Division Laboratory
The Great Atlantic and Pacific Tea Co., New York, N. Y.

DURING the past several years high frequency has found application in the heat treating of metals by induction and the heating of non-conductors or dielectric materials. At the present time, it is being proposed for many uses in the food industry. They range from the blanching of vegetables for freezing to the sterilization of packaged goods, and from the defrosting of frozen products to the dehydration of foods.

Dielectric heating units are being used at present for the heating of plastics and plywood. Many plastic products begin as a hard pill, which may not heat uniformly with conventional methods. Dielectric heat brings the entire pill to an even temperature for molding, resulting in products that have high strength and durability. The dielectric units used for plastics, however, are usually not suitable for food processing.

There are certain interesting peculiarities about the use of high frequency heating. One is that a true dielectric material will heat evenly throughout when placed in the high voltage field, because each molecule acts as an electrical condenser. Other materials, which are not true dielectrics but are considered as insulating materials, heat due to their dielectric losses when placed in a varying electrostatic field. The speed at which each material will heat depends upon its insulating characteristics. For example it is reported that packaged flour can readily be made insect-free due to the fact that any insects and insect eggs heat more rapidly than the flour and are killed. The electrical loss factor of each material governs to a large extent its suitability for treatment by high frequency heating.

High frequency heating is usually considered to be an expensive form of heat generation. For this reason it is not recommended for use in a process where the same result can be attained by the application of a more common form of heat. The power required to perform the task in question depends upon the weight of material the extent to which it is to be heated and its insulating properties. The normal operating efficiency of the unit itself is approximately 55 percent.

What Frequencies to Use

There is a divergence of opinion among the makers of dielectric heating units as to the best frequencies to use. The frequencies now being employed range from 13 to 27 megacycles. The voltages range from

This is the second of a series of articles on the application of electronic heating in the food industries. In an article in the April issue, V. W. Sherman, President of Sherman Industrial Electronics Co., gave a general discussion of the subject, with examples of uses in various food fields, including baking. In a future issue, an article will appear on the use of electronic heating for defrosting frozen eggs and fruits.—The Editors.

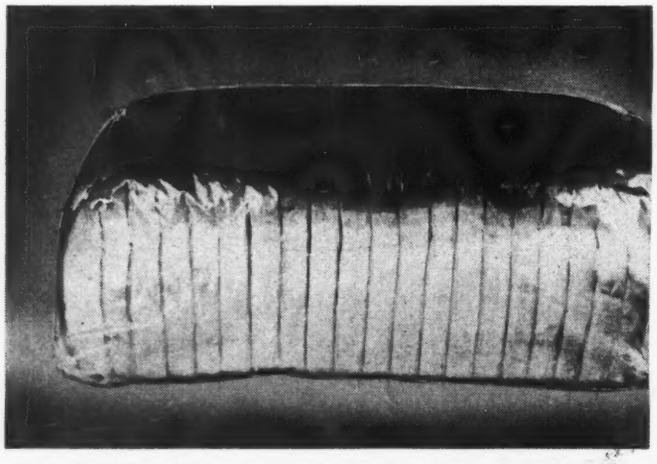


FIG. 1. Fourteen-day-old, wrapped sliced white bread heated to 140 deg. F. with high frequency heat. Note the absence of mold.

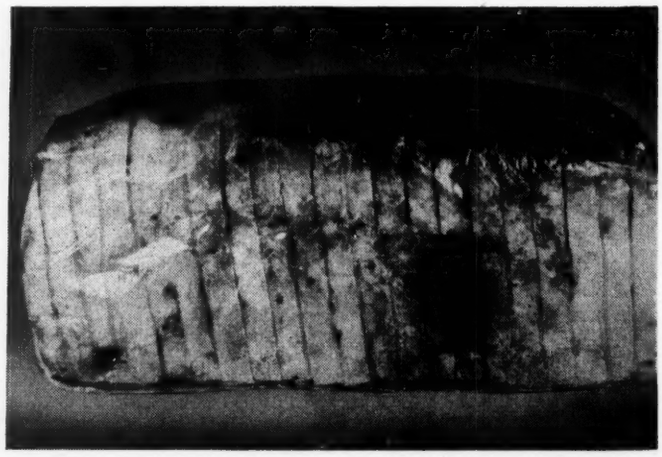


FIG. 2. Fourteen-day-old, wrapped sliced white bread. Note growth of mold on side of loaf. Loaves are sterile when freshly baked.

10,000 to 15,000. Higher frequencies show greater power losses when employed in large units. At lower frequencies, severe arcing may take place between the electrodes and the product. Although the use of higher frequencies helps to prevent this arcing, it tends to give more localized surface heating, referred to as "skinning effect." This is particularly noticeable in the case of frozen eggs where in defrosting, the outside of the mass may be cooked while the inside is still frozen. It is possible that units will be available in the near future operating at from 1 to 40 megacycles.

The heating capacity of an electronic system is expressed by the following formula:

$H=KLfV^2$

Where

H=Heat in B.t.u.'s per sec, per lb. of material
K=Constant
L=Loss factor as a decimal
f=Frequency in megacycles per sec.
V=Volts per in. of material

And

$L=Pe$

Where P=Power factor (Percent of output power being put into the material)
e=Dielectric constant

It will be noted that the B.t.u.'s per sec. per lb. can be increased most rapidly by increasing the voltage, due to its being a squared function. It is also possible to increase the B.t.u.'s by increasing the frequency. There are definite limitations, however, to increasing the frequencies above 40 megacycles.

Design Problem

Industrial electronic high frequency generating units, as manufactured today for a variety of purposes, are simple to operate. The high frequency current generator, however, is valueless without the proper applicator unit with the correct kind and arrangement of electrodes for treating the material. The design of a heating applicator is a task for which most food processors are not equipped. Suitable equipment can best be developed, however, by collaboration of the electrical manufacturer and the food processor.

Experimental Equipment

Experiments reported here were conducted with a 3 kw. output radio-frequency unit manufactured by the Federal Telephone and Radio Corporation. The apparatus had an input of 5 kw. The experiments were conducted at frequencies of approximately 15 megacycles. The overall efficiency of the apparatus was approximately 55 percent with a possible power factor slightly above 90 percent.

FIG. 3. Fourteen-day-old, wrapped Boston brown bread. (Left) Heated to 140 deg. F. with high frequency heat. (Right) No heat applied after wrapping. Note absence of mold on treated loaf.

Treating of Packaged Bread

Because of the unique properties of high frequency heat, it is possible to use it to render bread sterile in regard to mold, after the bread has been wrapped. Loaves of bread are sterile with respect to mold when they leave the oven. They become contaminated during cooling, slicing and wrapping although scrupulous care is taken to keep equipment clean. By killing the mold spores after the wrapper has been put on the bread, it is possible to maintain sterility until the consumer opens the package.

In sliced bread, mold contamination is possible at the center of the loaf as well as at the surface. It is necessary, therefore, to heat the whole loaf to the proper temperature for killing mold. The more commonly used methods of heating are not satisfactory for this purpose. If the bread is heated in an oven at the temperature necessary for sterilization, the heating is too slow. If heated in a hotter oven until the center of the loaf reaches the proper temperature, the wrapper and the outer portion of the loaf are heated much higher than necessary, causing changes that impair the effectiveness of the wrapper and lower the quality of the bread. Only the electronic treatment gives the rapid, uniform heating that is desired.

It was found that all types of bread, including Boston brown, could be made sterile by heating to 140 deg. F. The heating took place quite rapidly, 50 seconds being required to raise a 20-oz. loaf of the wrapped sliced white bread from room temperature to 140 deg. F. Considerable arcing and burning occurred at the sharp edges of the loaves of Boston brown bread, but this was overcome by rounding off the edges prior to heating. Loaves that had been heated to 140 deg. F. showed no mold growth after being stored at room temperatures for a period of three weeks.

In all cases, a small amount of moisture was driven from the bread during heating and was condensed upon the crust and upon the inner surface of the wrapper. This resulted in a damp crust immediately after the loaf was heated. This condensed moisture, however, was reabsorbed throughout the loaf within a few hours and the crust then regained its normal character.

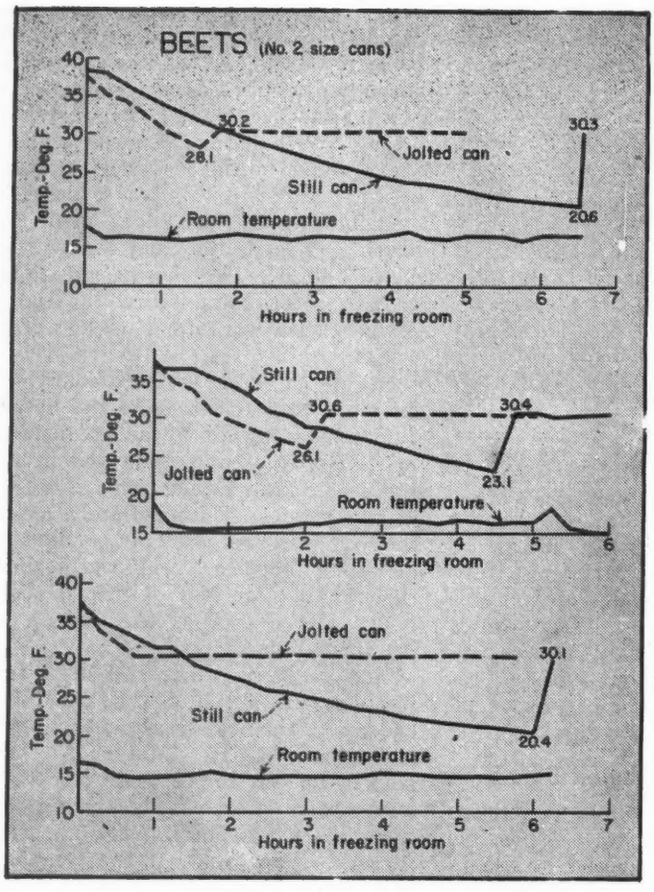
The packaging material used for wrapping the bread must be carefully chosen, or the heat treatment will not protect the loaf. Materials that soften, unseal, break or in any way lose their effectiveness during or after dielectric heating are unsatisfactory. Any break in the wrapper will allow moisture to escape and also afford an avenue for recontamination of the loaf. Wax paper was found to be unsatisfactory, as it heated rapidly and unsealed when the temperature of the loaf was below the melting point of the wax. Of the materials tried, cellophane proved the most satisfactory.

Electronic heat is also useful in the refreshening of stale bread. Stale loaves, heated in this way, were much better than they were before heating, although they could not be considered to be as good as freshly baked loaves.

The thiamin content of white bread was not impaired by the electronic treatment.

Large Scale Application

Although it has been shown that electronic heating is an excellent method for treating bread, its application to large scale baking production offers some difficulties. To be practical, the electronic machine must be able to heat the bread at the rate at which it comes from the slicing and wrapping machine, that is, about 50 loaves a minute. This must be done on a conveyor system, and probably can best be effected by several small units with electrodes at different points of the conveyor, rather than by one large unit.



Freezing Point Data Sheets And Cooling Curves

PART II

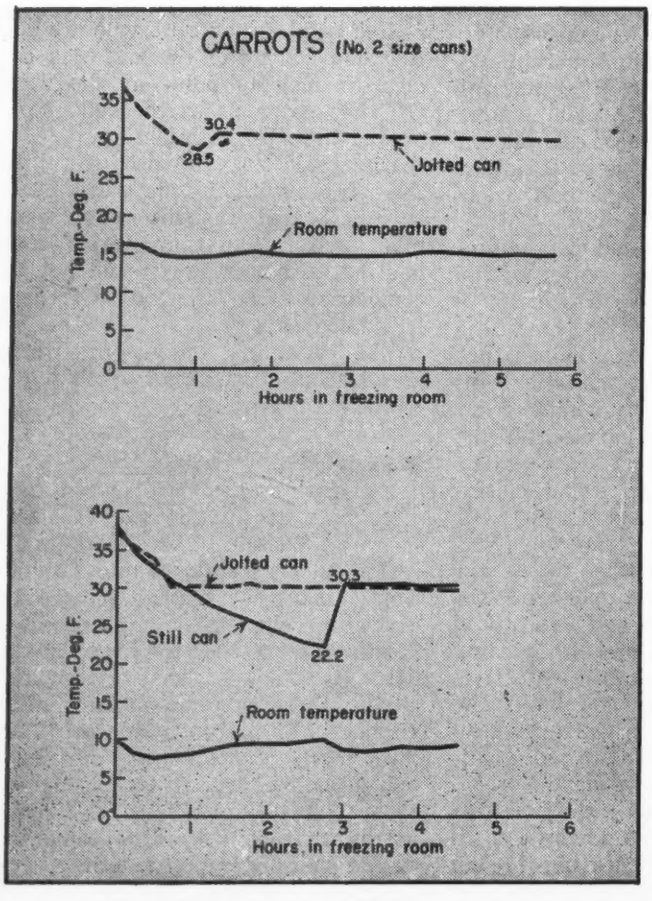
Information on apple sauce, asparagus, and various kinds of string beans appeared with Part I of these data sheets in the April issue of FOOD INDUSTRIES. Part III will appear next month.

Beets

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1-Still ...	14.5-16.1	37.2	1¼	5	9.7	6¼	30.1
1-Jolted .	14.5-16.1	37.6	½	...	..	½	30.5
2-Still ...	15.3-16.5	36.7	1½	3¼	7.1	4¾	30.4
2-Jolted .	15.3-16.5	37.3	¾	1½	4.5	2¼	30.6
3-Still ...	15.9-17.1	38.3	1¾	5	9.2	6¾	30.3
3-Jolted .	15.9-17.1	37.4	1	¾	2.1	1¾	30.2
4-Still ...	6.4- 7.7	37.7	1	1¾	7.2	2¾	30.3
4-Jolted .	6.4- 7.7	37.6	¾	¼	0.2	1	30.5

Freezing point range, 30.1° to 30.6°F.; average, 30.3°.

Inspection made immediately after each freezing test showed the contents to be heavy slush throughout the can.



Carrots

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1-Still ...	5.8-12.9	36.5	1¼	2	8.4	3½	31.0
1-Jolted .	5.8-12.9	34.6	¼	½	0.5	¾	29.1
2-Jolted .	14.5-16.1	37.0	½	¾	1.9	1¼	30.4
3-Still ...	8.2-10.1	38.0	¾	2	8.1	2¾	30.3
3-Jolted .	8.2-10.1	37.5	¾	¼	0.2	1	30.2
4-Still ...	15.7-15.9	36.2	¾	¾	0.1	1½	30.5

Freezing point range, 29.1° to 30.5° F.; average, 30.3°. The variation in the freezing points is due evidently to the different methods of preparing canned foods by the different processors.

Inspection made immediately after the test showed hard frost to a depth of ½ inch around the sides of the can.

Hard freezing showed no ill effect.

Acknowledgments

This research, an exhaustive investigation of the freezing of canned goods, was conducted by D. H. Rose, senior physiologist, Division of Fruit and Vegetable Crops and Diseases, U. S. Department of Agriculture, and H. D. Johnson, transportation specialist, Transportation, Rates and Services Division, Office of Distribution, War Food Administration. M. N. Weatherhead, assistant mechanical engineer of the Fruit Growers Express Company, assisted the government officials in the investigation, which was conducted by the experimental cold storage laboratory of the Plant Industry Station, U. S. Department of Agriculture, Beltsville, Md.

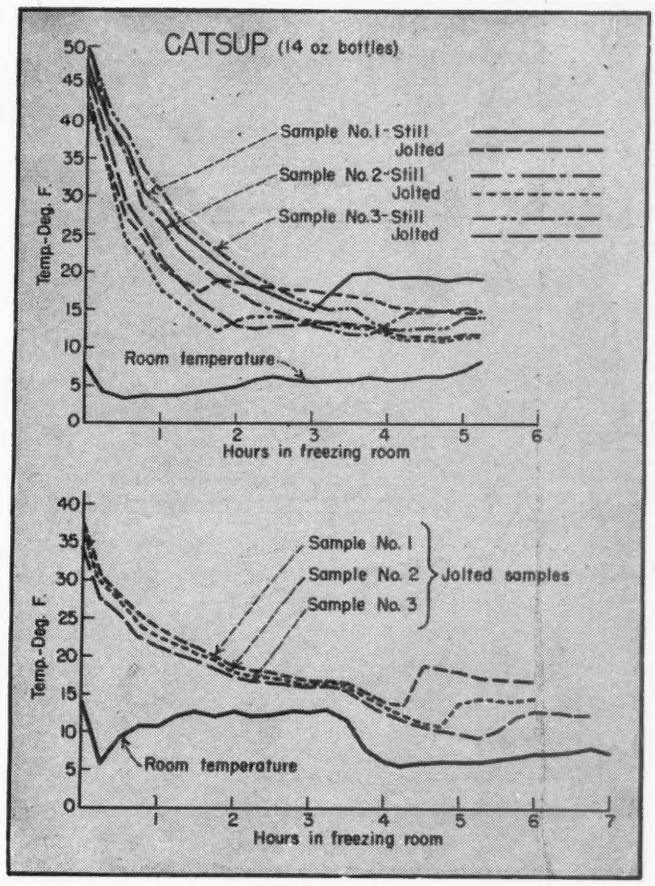
Catsup

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
Sample No. 1							
14-oz. bottles:							
1-Still ...	16.1-17.1	39.5	...	...	..	Did not freeze	
1-Jolted .	16.1-17.1	39.4	3¼	3¼	2.3	Did not freeze	
2-Still ...	6.4- 7.0	39.6	2	2	4.9	4	19.9
2-Jolted .	6.4- 7.0	39.9	1¼	3	9.7	4¼	19.9
3-Jolted .	6.7- 7.4	32.3	¾	1¼	0.1	2	19.6
3-Jolted .	6.7- 7.4	32.5	¾	¾	1.9	1½	19.1
3-Still ...	6.7- 7.4	30.5	¾	1	1.8	1¾	19.1
3-Still ...	6.7- 7.4	32.1	1	1¼	2.4	2¼	19.6
3-Still ...	6.7- 7.4	33.7	¼	2¾	0.1	3½	19.0
1-Still ...	3.2- 4.2	48.0	2	1¾	5.0	3¾	19.9
4-Still ...	3.2- 4.2	41.7	1¼	½	1.8	1¾	19.0
4-Jolted .	3.2- 4.2	46.6	1¼	¾	3.1	2	19.5
5-Still ...	5.8-12.9	36.7	3	4¼	6.9	Did not freeze	
5-Jolted .	5.8-12.9	37.2	2	2½	5.2	4½	18.7
Sample No. 2							
1-Still ...	3.2- 4.2	49.6	2½	2	3.0	4½	14.8
1-Still ...	3.2- 4.2	46.8	1¾	1¾	3.2	3½	15.7
1-Jolted .	3.2- 4.2	43.2	1½	¾	1.9	2¼	14.0
2-Still ...	5.8-12.9	35.8	6	1¼	0.4	7¼	13.1
2-Jolted .	5.8-12.9	37.0	3¾	1½	0.4	7¼	13.1
Sample No. 3							
1-Still ...	3.2- 4.2	46.9	3¾	1¼	1.4	5	13.9
1-Still ...	3.2- 4.2	47.4	2	1¾	2.1	3¾	13.9
1-Jolted .	3.2- 4.2	46.1	2	1	0.8	3	13.2
2-Still ...	5.8-12.9	36.1	5¼	2	..	Did not freeze	
2-Jolted .	5.8-12.9	34.8	4	2	3.5	6	12.6

Freezing point range:
Sample No. 1, 18.7° to 19.9° F.; average, 19.4°.
Sample No. 2, 13.1° to 15.7° F.; average, 14.4°.
Sample No. 3, 12.6° to 13.9° F.; average, 13.4°.

Inspection immediately after the tests showed the catsup frozen stiff.

Difference in the freezing points of the 3 samples of catsup were doubtless due to differences in composition.

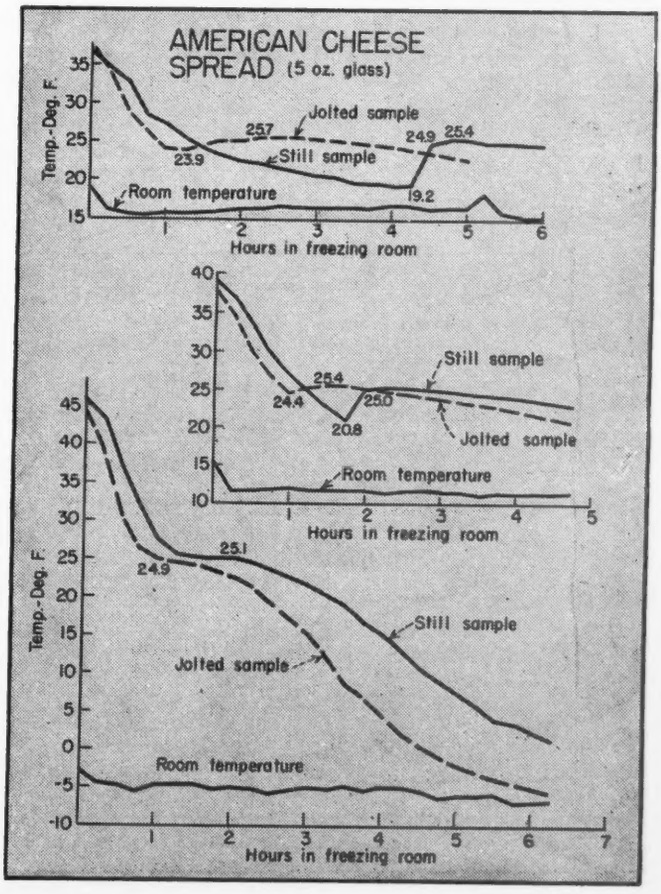


American Cheese Spread

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
5-oz. glass:							
1-Still ..	15.1 - 18.2	36.8	1¼	3¼	6.2	4½	25.4
1-Jolted	15.1 - 18.2	37.5	1	1½	1.8	2½	25.7
2-Still ..	11.1 - 11.9	38.5	1¼	¾	4.2	2	25.0
2-Jolted	11.1 - 11.9	37.5	1	...	0.7	1	25.1
3-Still ..	−6.6 - −3.2	45.4	2	2	0	1	25.1
3-Jolted	−6.6 - −3.2	44.1	1	1	0	1	...

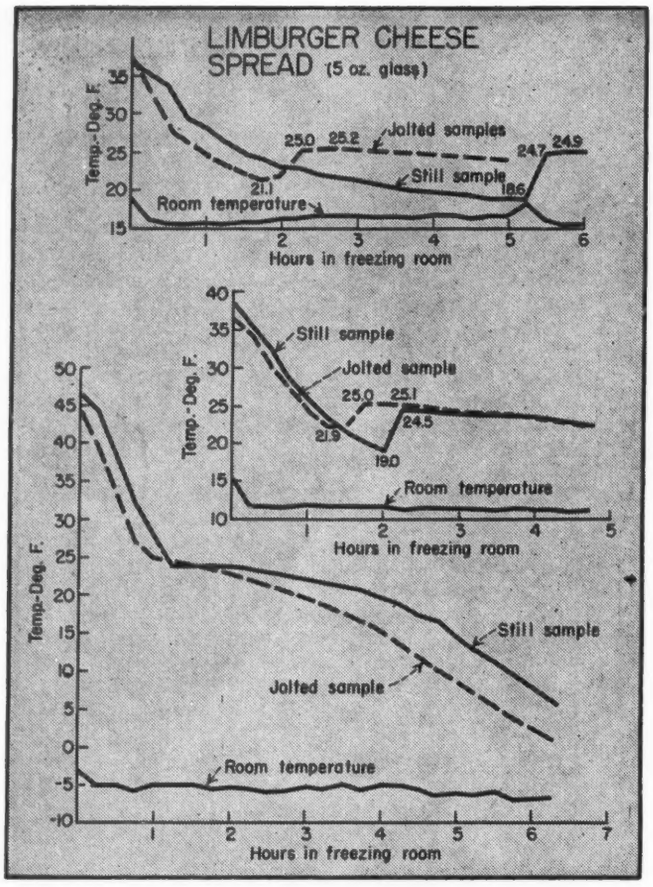
Freezing point range, 25.0° to 25.7° F.; average, 25.3°.

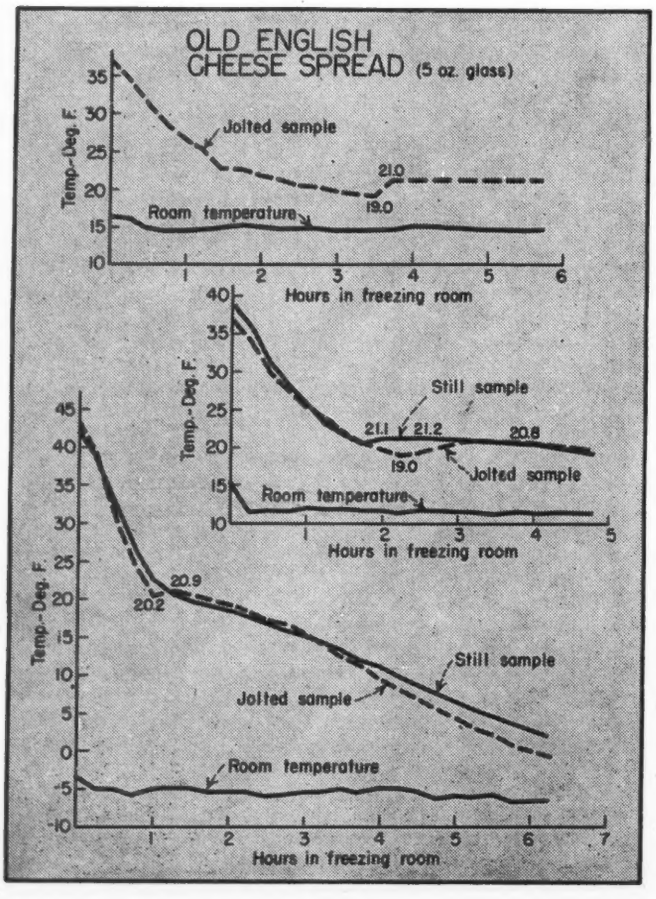
Inspection made immediately after the test showed contents frozen stiff.



Hard Frozen Samples

The inspection of hard frozen samples was made by the Processed Products Standardization and Inspection Division, Fruit and Vegetable Branch, U. S. Department of Agriculture.





Cheese Spreads—5-oz. Glasses

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
Limburger Cheese Spread							
1-Still ..	15.1 - 18.2	36.9	1½	4	6.1	5½	25.0
1-Jolted	15.1 - 18.2	37.5	1	1¼	3.1	2¼	24.7
2-Still ..	11.2 - 11.9	38.6	1	1¼	5.5	2¼	24.5
2-Jolted	11.2 - 11.9	36.4	1	¾	3.1	1¾	25.0
3-Still ..	−6.6 - −3.2	46.8	1¼	½	..	1¾	23.7
3-Jolted	−6.6 - −3.2	44.7	1	...	...	...	...
4-Jolted	7.7- 10.1	42.3	1¼	½	3.0	1¾	25.0
Old English Cheese Spread							
1-Jolted	14.5 - 16.1	37.1	2¼	1½	2	3¾	21.0
2-Still ..	11.2 - 11.9	38.9	1½	½	0.6	2	21.1
2-Jolted	11.2 - 11.9	36.6	1½	1¼	0.8	2¾	20.0
3-Still ..	7.7 - 10.1	41.5	1½	¾	3.2	2¼	20.6
4-Still ..	−6.6 - −3.2	43.1	1	¼	0.7	1¼	20.9
4-Jolted	−6.6 - −3.2	42.6	1	...	..	...	...
Olive Pimento Cheese Spread							
1-Still ..	15.1 - 18.2	37.0	1	1½	5.6	2½	27.6
2-Jolted	14.5 - 16.3	37.3	1	½	0.2	1½	27.7
3-Still ..	−6.6 - −3.2	44.7	1¼	...	..	1¼	27.6
3-Jolted	−6.6 - −3.2	45.8	1¼	...	..	...	...
Pimento Cheese Spread							
1-Still ..	15.3 - 16.6	37.6	1	1½	6.1	2½	28.5
1-Jolted	15.3 - 16.6	37.6	¾	¾	0.2	1½	28.0
2-Still ..	11.1 - 11.9	38.6	¾	1½	8.6	2¼	28.2
2-Jolted	11.1 - 11.9	37.6	1	¼	0.1	1¼	28.1
3-Still ..	−6.6 - −3.2	49.9	1¼	¼	..	1½	28.5
3-Jolted	−6.6 - −3.2	94.7	1¼	¼	..	1½	28.2
Pineapple Cheese Spread							
1-Still ..	16.1 - 16.7	38.3	1¾	2¼	6.1	4	27.6
1-Jolted	16.1 - 16.7	38.7	1¼	1¼	7.3	2½	27.4
2-Jolted	15.3 - 16.5	38.0	1	1¼	0.5	2¼	27.8
3-Still ..	11.3 - 11.9	38.6	¾	1¾	10.1	2½	27.5
3-Jolted	11.3 - 11.9	37.6	1	½	0.1	1½	28.0
4-Still ..	−4.9 - −6.8	43.8	1	...	..	1	...
4-Jolted	−4.9 - −6.8	45.8	1¼	...	..	1¼	27.8
Relish Cheese Spread							
1-Still ..	16.1 - 16.7	37.3	1	5	9.2	6	26.8
1-Jolted	16.1 - 16.7	37.2	¾	¾	2.8	1½	26.6
2-Still ..	11.3 - 11.0	39.3	1	1¼	7.0	2½	26.7
2-Jolted	11.3 - 11.9	37.3	1½	¾	0.6	2¼	26.6
3-Still ..	−6.8 - −3.2	46.5	1½	¼	0.1	1¾	26.8
3-Jolted	−6.8 - −3.2	46.4	1¼	...	..	1½	26.8

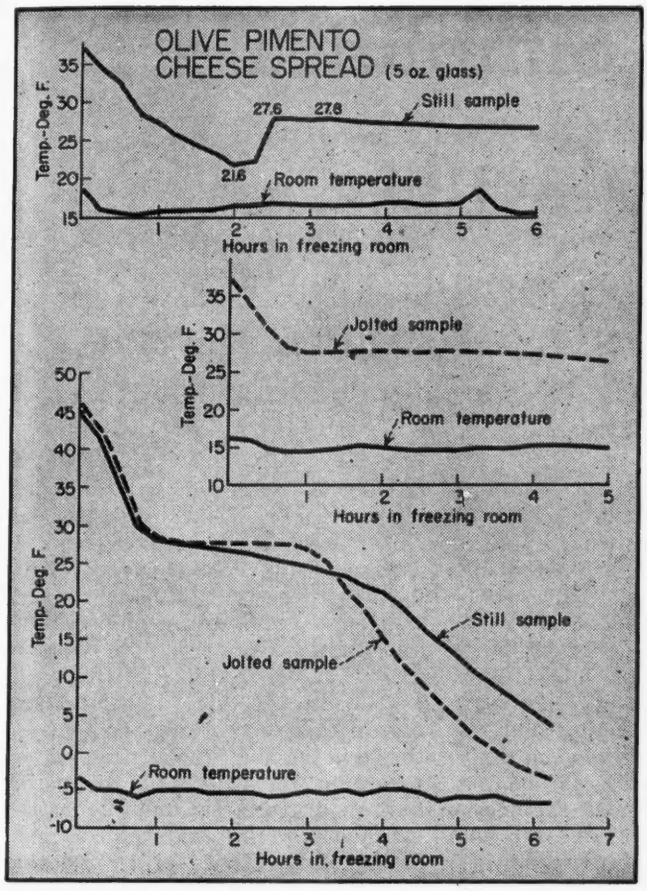
Freezing Points of Cheese Spreads

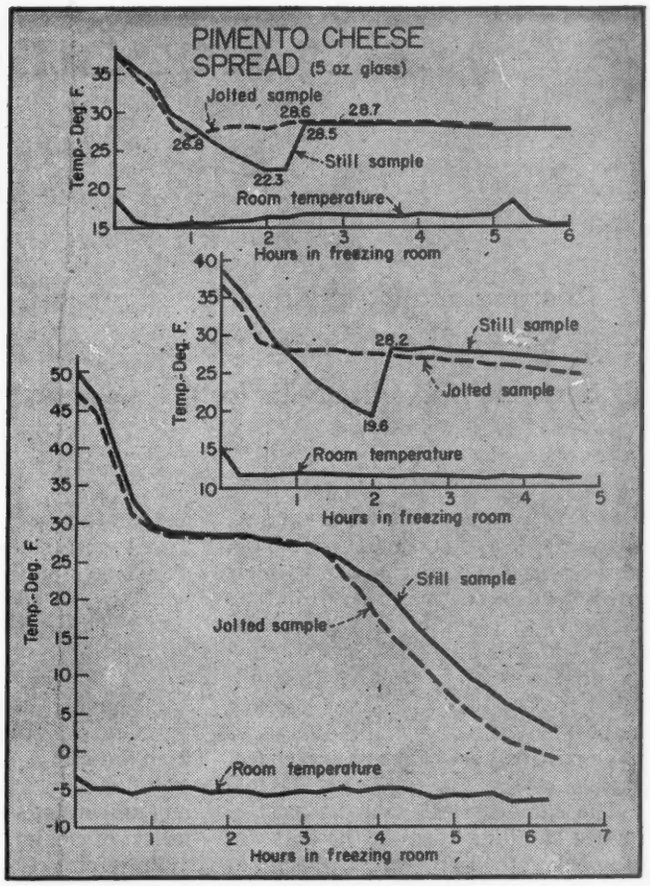
Type	Freezing point range, deg. F.	Freezing point average, deg. F.
American	25.0-25.7	25.3
Limburger	23.7-25.0	24.7
Old English	20.0-21.1	20.5
Olive Pimento	27.6-27.7	27.6
Pimento	28.0-28.5	28.3
Pineapple	27.4-28.0	27.7
Relish	26.6-26.8	26.7

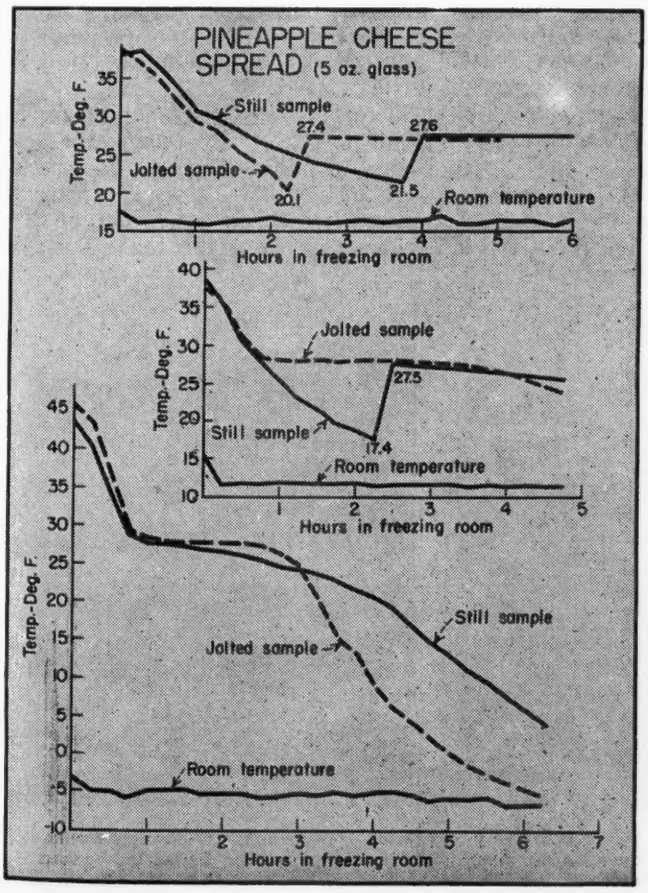
Inspection made immediately after test showed the contents frozen stiff.

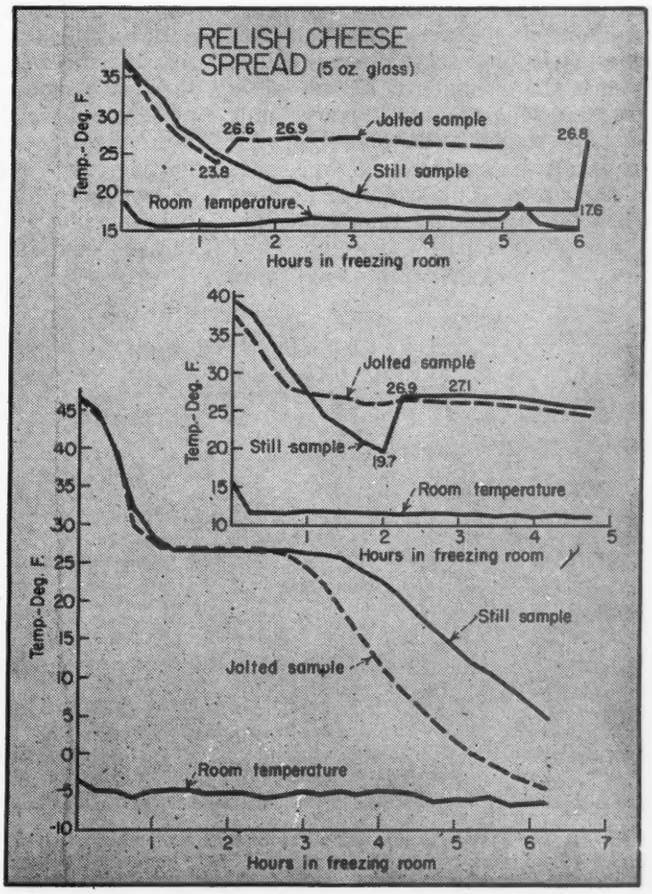
Summary of Data on Cheese Spreads
Undercooling in Deg. F. at Different Temperatures

Room Temp. Agitation	15 to 18 Shake	15 to 18 Still	9 to 12 Shake	9 to 12 Still	7 to 10 Shake	7 to 10 Still	−3 to −6.6 Shake	−3 to −6.6 Still
American	1.8	6.2	0.7	4.2	..	..	0	0
Limburger	3.1	6.1	3.1	5.5	3.0	..	0	0
Old English	2	..	0.8	0.6	..	3.2	0	0.7
Olive Pimento	..	5.6	0.2	..	..	..	0	0
Pimento	0.2	6.1	0.1	8.6	..	..	0	0
Pineapple (1)	7.3	6.1	0.1	10.1	..	..	0	0
Pineapple (2)	0.5	..	..	..	..	..	..	..
Relish	2.8	9.2	0.6	7.0	..	..	0	0.1
Roka	9.1	..	0.1	5.3	..	..	0	0
Total	26.8	39.3	5.7	41.3	3.0	3.2	0	0.8
No. of tests	8	6	8	7	1	1	8	8
Average	3.3	6.5	0.71	5.9	3.0	3.2	0.0	0.1


OLIVE PIMENTO CHEESE SPREAD (5 oz. glass)
Temp.-Deg. F.
27.6
27.8
Still sample
21.6
Room temperature
Hours in freezing room
Jolted sample
Room temperature
Hours in freezing room
Still sample
Jolted sample
Room temperature
Hours in freezing room


PIMENTO CHEESE SPREAD (5 oz. glass)
Temp.-Deg. F.
Jolted sample
28.6
28.7
26.8
28.5
Still sample
22.3
Room temperature
Hours in freezing room
Still sample
28.2
Jolted sample
19.6
Room temperature
Hours in freezing room
Still sample
Jolted sample
Room temperature
Hours in freezing room


PINEAPPLE CHEESE SPREAD (5 oz. glass)
Temp.-Deg. F.
Still sample
27.4
27.6
Jolted sample
20.1
21.5
Room temperature
Hours in freezing room
Jolted sample
27.5
Still sample
17.4
Room temperature
Hours in freezing room
Still sample
Jolted sample
Room temperature
Hours in freezing room


RELISH CHEESE SPREAD (5 oz. glass)
Temp.-Deg. F.
26.6
26.9
Jolted sample
26.8
23.8
Still sample
Room temperature
17.6
Hours in freezing room
Jolted sample
26.9
27.1
Still sample
19.7
Room temperature
Hours in freezing room
Still sample
Jolted sample
Room temperature
Hours in freezing room

Air Loading Simplifies Bulk Shipments

This pneumatic system for loading and unloading trucks, used by a Boston brewer to transfer grain from rail siding to plant bins, permits the discarding of cumbersome bag shipments for the more economical loose grain carload haul in boxcars

BECAUSE its plant is not located directly on a railroad siding, Haffenreffer & Co., Inc., Boston brewers, must haul the barley malt grain used in the manufacture of its ale from rail siding to brewery by truck. The loading and unloading in this operation is done by the patented Holly pneumatic system, which makes possible the rail haulage of the grain in bulk carloads instead of bags.

The same system may be used to reduce handling costs in the transfer of other food products, such as sugar, cocoa, salt and nuts. Although a tank is used in each case to carry the load, the tank and loading and unloading power unit may be combined in self-contained two- or three-axle trucks or a tractor semi-trailer. Where the volume to be moved is great, a separate truck power unit may be employed to load truck or trailer tanks having no power units of their own. This can only be done when the subsequent tank unloading is done by gravity.

The economy of the Holly system lies in the fact that it enables the user to purchase malt or other grain at a lower price in bulk than would be the case in bags. It also eliminates the costly manual labor of loading and unloading, along with waste and lost time caused by broken bags, malt sticking inside the bags, the bag counting, bundling and return shipping. In addition, the Holly system, with full pneumatic loading and unloading, eliminates the possibility of moisture getting into the malt during the handling, resulting in contamination or spoilage that may cause off-tastes in brews.

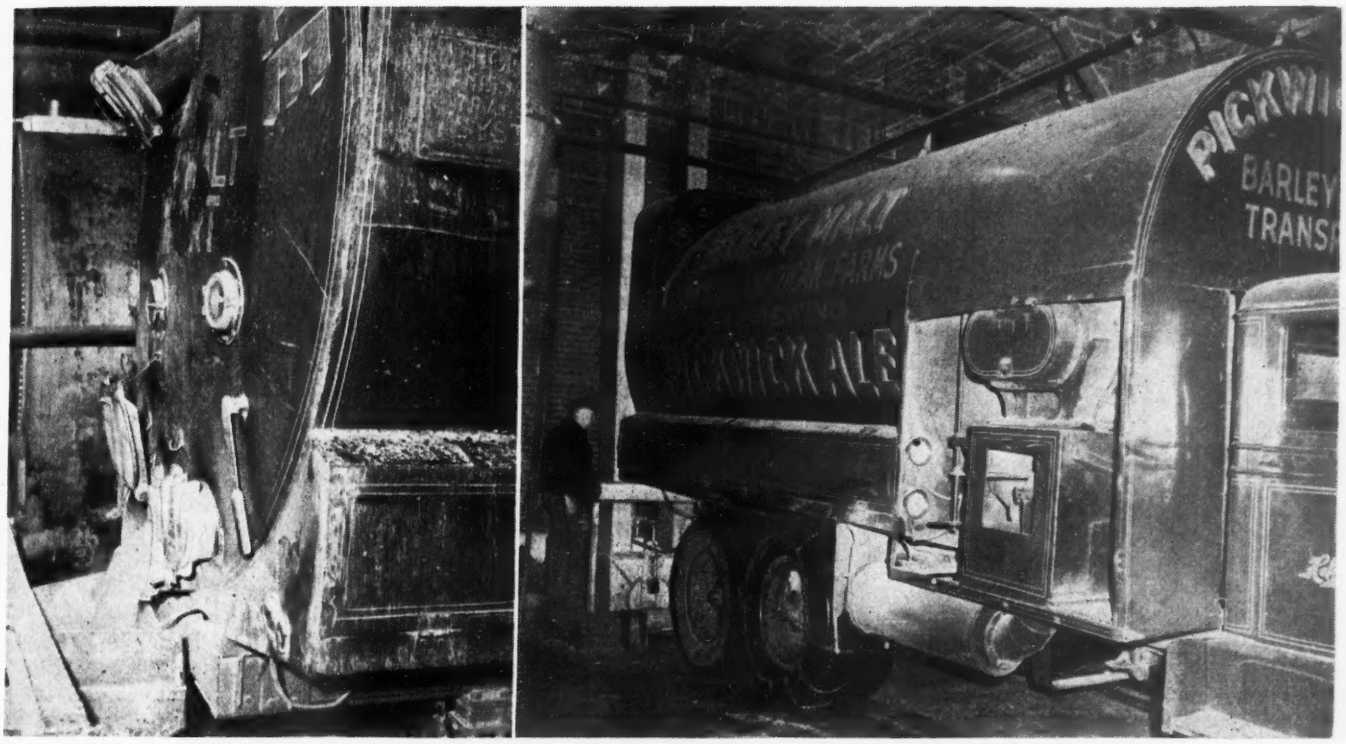
Will Use Pressure

In its malt transfer work, the Haffenreffer brewery employs one White three-axle truck with a load capacity of 22,000 lb. or 400 bu., but is awaiting delivery of a new tractor-trailer unit to carry 500 bu.

As shown in one of the accompanying illustrations, the malt from the present Haffenreffer tank truck is unloaded by gravity into an existing vertical bucket conveyor, which raises it 80 ft. above the ground to a distributing screw conveyor. This, in turn, deposits the malt through the tops of the storage bins. With the delivery of the new tractor-trailer, however, the malt will be unloaded into a pipeline leading to the tops of the storage tanks and carried through the line under pressure by reversing the action of the power unit in drawing the malt from the railroad car into the vehicle tank. The malt is shipped in a regulation railroad box car, which must be tight and thoroughly cleaned before loading. A paper lining, to prevent the admission of dust or dirt while in transit, is not required with malt, but is used for shipments of corn grits.

The patented Holly equipment is made by the Holly Pneumatic Systems, Inc., New York City. It consists of a cylindrical tank, a vacuum pump, two screw conveyors on the inside bottom of the tank, and two

Here are two stages in the unloading of bulk malt from a boxcar into a 400-bu. tank by use of the patented Holly pneumatic system. The equipment under the hood, at the front end of the truck tank is the vacuum pump and behind it is the separate gasoline engine that operates the pump. With the driver serving as the only necessary operator, it takes about ten minutes to empty the malt into the tank.

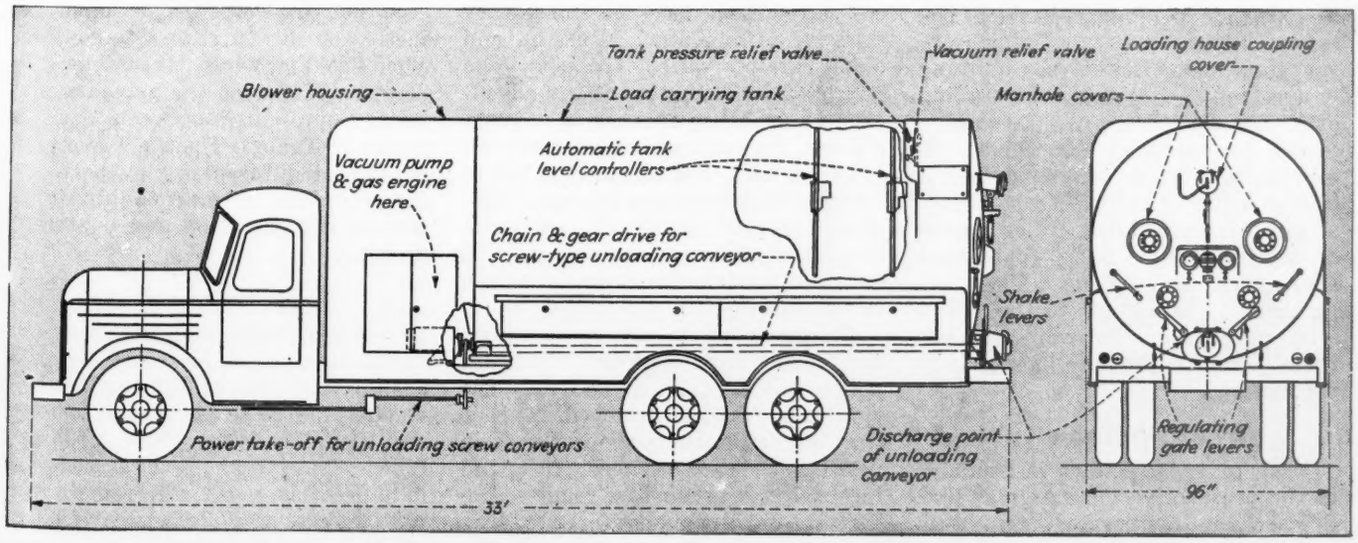


These two views of the tank unloading operation were made as the malt was being discharged by gravity from the screw conveyors inside the tank. The malt passes through the chute leading to a vertical bucket conveyor, which carries it to the tops of the malt storage tanks. The various fittings on the rear of the tank, at left, are more fully identified in the line drawing at the bottom of the page.

hose connections, one for filling the tank and the other for emptying when gravity unloading is not employed. All the equipment is mounted on any desired make of truck or trailer chassis to suit the capacity of the tank. These vary in size from 200 to 600 bu.

The equipment for unloading the malt from the railroad box car follows much the same principle as that of a huge vacuum cleaner. In operation, the vehicle is driven to the rail siding and spotted opposite the open door of the box car. The truck driver attaches one end of the suction hose to the intake connection at the top of the tank, at the rear. The other end of the hose, fitted with a nozzle, is submerged in the malt in the car. The vacuum pump then causes the malt to be drawn into the tank. When the tank is full, the pump is shut off by a bin level controller.

For unloading at the brewery, gravity is employed. The screw conveyors in the bottom of the tank are started and discharge the malt through an opening at the bottom rear of the tank. If pressure unloading is used, the vacuum pump action is reversed. One end of the loading hose is attached to the discharge end of the tank screw conveyors and the other end to the pipe leading to the malt storage tanks.



Side and end view drawings of a typical Holly pneumatic system, mounted on a three-axle truck chassis, show the component parts of the equipment. The vacuum pump, ahead of the tank, may be operated by a V-belt drive from a separate gasoline engine, or by a power take-off from the truck engine. The screw discharge conveyors, in the tank bottom, may be operated from the vacuum pump, from a separate electric motor, or from a vehicle engine power take-off. In the loading operation, the velocity of the air suction, drawing the malt into the tank is reduced at the tank inlet by a special nozzle. The pump draws its air from an inside bag filter in tank rear.

HOW TO BUY POULTRY

Shall industrial buyers of poultry for dining room or ingredient use purchase live, dressed or eviscerated birds? An analysis of costs, based on Chicago wholesale prices, gives economic basis for decision

By LT. I. L. WILLIAMS and B. W. GARDNER, Jr.
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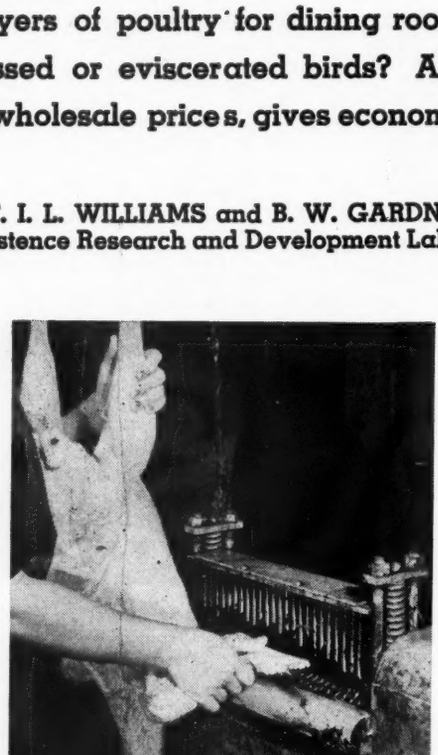
FOOD MANUFACTURERS and processors who use poultry meat in their products or who operate their own dining rooms and cafeterias, want to know whether to buy their poultry alive, dressed or eviscerated. Some believe that live poultry is the best buy. Others contend that greater value is received per dollar expended when the poultry is dressed or is eviscerated and ready to use. There are those, however, who don't like the apparently excessive price of eviscerated poultry and for that reason purchase the more attractively priced live or dressed bird. Here are some facts that may help new purchasers make a decision.

First, the prospective purchaser should know what kinds of poultry are available. Most of it is divided into three general classes, the first of which is "broilers and fryers." These are young chickens of either sex, ranging in age from 8 to 20 weeks, and weighing from 2 to 3½ lb. The meat is sufficiently tender to be cooked by broiling or frying. The second class is "roasters," which are young chickens of either sex, ranging in age from 5 to 9 months, weighing over 3½ lb. They can be cooked tender by roasting. The third general class is "hens" or "fowl." This class consists of mature female birds of any age or weight. Other classes of poultry include cocks (old roosters), stags and capons. They are particularly important to the industrial purchaser who wants to use them for canning or in specialty products.

All Available

Each of these classes is available to the prospective purchaser as live, dressed, or eviscerated (ready-to-cook) poultry. Live poultry is exactly what the name implies. This class can be purchased at less cost-per-pound than either of the other two classes. A good judge of the health and fleshing of the bird, or a company that has the necessary equipment for killing, dressing and disposing of waste products, can purchase live poultry at an advantage if the labor expense is not considered. Present conditions, however, are such that, if a company is not in the poultry killing and dressing business, there is doubtful incentive to acquire the necessary equipment, and to spend the labor and time required to kill and dress live poultry.



Investment in equipment such as this wing-stripping machine, along with the added labor cost, might well outweigh the price differential between "live" and "eviscerated" poultry, even in an abnormal market.

Dressed poultry, commonly known as "New York dressed," is that which has been killed and only the blood and feathers removed. This is the class most commonly displayed in retail outlets. The head, feet and internal organs must be removed before the bird is ready for use. The cost-per-pound of dressed poultry is less than that for eviscerated, but considerable waste and work are involved before dressed poultry is ready for use.

Eviscerated or "ready-to-cook" poultry is becoming very popular, especially with those who have limited facilities for handling dressed birds. Eviscerated poultry is ready for use since all the waste parts are removed at time of slaughter. This class is prepared under the supervision of a government veterinary inspector who examines all birds for evidence of disease or other "off-condition." Where government inspection is practiced there are certain sanitary standards that a plant must meet before it is allowed to pack this class of poultry. Eviscerated poultry is usually packaged and frozen immediately after dressing. Its price-per-pound is higher than for the other classes. For that reason, it is often rejected by purchasers in favor of dressed or live poultry.

Waste Factor

The actual cost-per-pound of edible meat, which includes the meat-covered bones, is the most important factor for the purchaser to consider when deciding what class to buy. The first consideration, the percentage of waste represented by each class, is shown in Table I. These are averages and slight differences may be found for any given bird, depending on its weight, conformation and degree of fleshing.

Relative Costs

Two live broilers or fryers weighing a total of 6 lb. could be purchased wholesale in Chicago last November for 28.7c per lb., or a total cost of $1.72. When these birds are killed, dressed and eviscerated, 3.6 lb. of edible meat will remain for use at a cost of 47.7c per lb. If birds of the same quality and weight (dressed weight 5.2 lb.) are purchased dressed, at an initial cost of 37.4c per lb. or a total cost of $1.94, 3.6 lb. of edible meat will remain

after eviscerating at a cost of 53.9c per lb.

When purchasing eviscerated broilers or fryers, the cost was 55.7c per lb. This price makes birds of the same quality and weight (3.6 lb. of edible meat) cost $2.00. These figures show that the edible meat of the eviscerated birds costs 8.0c per lb. more than that of the live bird and 3.0c per lb. more than a dressed bird. In these calculations no value has been placed on the time that would be required for the user to kill, dress, and eviscerate live poultry or to eviscerate the dressed poultry.

Live Roasters

In a similar price comparison, a 6-lb. live roaster at 28.7c per lb. costs $1.72. After killing and dressing, 4 lb. of edible meat will remain at a cost of 43c per lb. If this bird is purchased dressed, it will cost 37.4c per lb. or 49.5c per lb. for edible meat, which is 6.5c per lb. more than for the live bird. The cost-per-pound of the edible meat of this same bird in the eviscerated form is 52.6c. On this price basis, the actual overall saving on dressing the live bird is 9.6c per lb. for the edible meat.

Live Hens

A live 6-lb. hen purchased for 24.1c per lb. will cost $1.44. After this bird has been prepared for use, 4.3 lb. of edible meat will remain at a cost of 33.5c per lb. This bird may be purchased dressed (5.4 lb. dressed weight) for 32.1c per lb., which, after preparation, will make it (4.3 lb. eviscerated weight) cost 40.2c per lb. or 6.7c per lb. more. The ceiling base price for an eviscerated hen is 45.4c per lb. On this price basis, the saving from killing, dressing and eviscerating the bird at point of use is approximately 12c per lb. A lesser saving of 5.0c per lb. will result from buying the hen dressed instead of eviscerated. The details of calculations on roasters and hens are given in Table III and IV. Again, the value of the user's time is not considered in preparing the poultry.

A summary of the added cost to the user over the cost of the edible meat that remains after preparation of the live poultry is given in Table V. Now that the user knows what he must pay for the convenience of each type of poultry, the question of the economics of each arises. Perhaps the best way to determine this is to review the actual cost of producing each of the three types.

TABLE I—Total Percentage of Live Weight Loss in Various Classes of Poultry During Killing, Dressing and Eviscerating Operations.

Type	Percent Waste: Live to dressed	Dressed to eviscerated	Total
Broilers and Fryers	14	31	40
Roasters	12	25	33
Hens	10	21	29

Summary

In general, the poultry processor requires 3c per lb. to prepare the dressed type and another 3¾c to prepare the eviscerated, or a total of 6¾c per lb. of finished edible meat. A summary of the added cost to the user for each type as compared to the processor's cost and the resulting margin is shown in Table V. A study of this table indicates that the processor has his greatest margin when selling dressed poultry. Comparison of the margin the processor has on live poultry with that for eviscerated type poultry shows that the user pays the processor 1¼c to over 5c profit per pound of edible meat for preparing the poultry.

Although the cost and general inconvenience of offal disposal are very difficult to estimate, one can logically assume that the purchase of eviscerated poultry is economical. In addition, an increase of 30c to nearly 50c in total cash expenditure for 4 lb. of edible meat (of which 5 to 20c is processor profit) is a very economical form of insurance that the poultry is federally inspected. That means it is free from disease and is handled under sanitary conditions.

These comparisons of the relative costs of poultry are of economic importance to processors, distributors, and large purchasers. The examples show how the differentials are calculated. In preparing this article the authors have drawn on an extensive experience gained during their wartime experience with the Quartermaster Corps.—The Editors.

TABLE II—Actual Cost of Edible Meat in Broilers and Fryers When Purchased Alive, Dressed or Eviscerated.

Type	Type Purchased: Live Wt. yield (lb.)	Live Cost per lb.* (cents)	Live Total cost (dollars)	Dressed Wt. yield (lb.)	Dressed Cost per lb. (cents)	Dressed Total cost (dollars)	Eviscerated Wt. yield (lb.)	Eviscerated Cost per lb. (cents)	Eviscerated Total cost (dollars)
Live	6.0	28.70	1.72	..	....	...	..	....	...
Dressed	5.2	33.1	1.72	5.2	37.40	1.94	..	....	...
Eviscerated	3.6	47.8	1.72	3.6	53.9	1.94	3.6	55.7	2.00

*The prices listed here are wholesale base ceiling prices for Chicago for November, 1945.

TABLE III—Actual Cost of Edible Meat in Roasters When Purchased Alive, Dressed or Eviscerated.

Type	Type Purchased: Live Wt. yield (lb.)	Live Cost per lb.* (cents)	Live Total cost (dollars)	Dressed Wt. yield (lb.)	Dressed Cost per lb. (cents)	Dressed Total cost (dollars)	Eviscerated Wt. yield (lb.)	Eviscerated Cost per lb. (cents)	Eviscerated Total cost (dollars)
Live	6.0	28.7	1.72	..	...	...	..	...	...
Dressed	5.3	32.5	1.72	5.3	37.4	1.98	..	...	...
Eviscerated	4.0	43.0	1.72	4.0	49.5	1.98	4.0	52.6	2.10

*The prices listed here are wholesale base ceiling prices for Chicago for November, 1945.

TABLE IV—Actual Cost of Edible Meat in Hens or Fowl When Purchased Alive, Dressed or Eviscerated.

Type	Type Purchased: Live Wt. yield (lb.)	Live Cost per lb.* (cents)	Live Total cost (dollars)	Dressed Wt. yield (lb.)	Dressed Cost per lb. (cents)	Dressed Total cost (dollars)	Eviscerated Wt. yield (lb.)	Eviscerated Cost per lb. (cents)	Eviscerated Total cost (dollars)
Live	6.0	24.10	1.44	...	...	...	...	...	...
Dressed	5.4	26.66	1.44	5.4	32.10	1.73	...	...	...
Eviscerated	4.3	33.50	1.44	4.3	40.23	1.73	4.3	45.4	1.95

*The prices listed here are wholesale base ceiling prices for Chicago for November, 1945.

TABLE V—Summary of Additional Cost in Cents per Pound to Purchaser Over Cost of Edible Meat from Live Poultry, Cost of Processor and Processor's Margin.**

	Broilers or Fryers: Cost to user over live cost (cents)	Proc-essor's cost (cents)	Proc-essor's margin (cents)	Roasters: Cost to user over live cost (cents)	Proc-essor's cost (cents)	Proc-essor's margin (cents)	Hens: Cost to user over live cost (cents)	Proc-essor's cost (cents)	Proc-essor's margin (cents)
Live to Dressed	+5.00	3.00	+2.00	+6.5	3.00	+3.50	+6.7	3.00	+3.70
Dressed to Eviscerated.	+3.00	3.75	—0.75	+3.1	3.75	—0.65	+5.2	3.75	+1.45
Eviscerated or Total.....	+8.00	6.75	+1.25	+9.6	6.75	+2.85	+11.9	6.75	+5.15

**These cost differentials were compared with those derived by using wholesale base ceiling prices in New York for May. The results obtained were in substantial agreement with those of this table.

Quality Grades are Essential For Frozen Food Packs

Frozen food quality can be maintained only if suitable standards are adopted by the entire industry for raw produce and finished product. Present conditions compel distributors to exercise quality supervision.

By GERALD A. FITZGERALD, Managing Director,
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INSTEAD of standing by and decrying the poor quality for which new packers just entering the field are blamed, it may be high time for frozen food packers, worthy of the name, to take the lead by creating industry-wide standards—not only for the newcomer, but also for themselves. If they do not assume this responsibility, they might have to watch packers of precooked frozen foods "kill the goose that lays the golden egg."

Public Wants Quality

The following story illustrates what is happening due to lack of uniform quality. One of the largest packers of a full line of fruits and vegetables knows that only 4 of 24 of his products passed the fancy grade in a recent test made by one large store. A number of his products were banned by this store. He may not know that his entire line has been discontinued by another store. In this same store, another nationally advertised brand had been "panned" by customers to such a degree that, during a pea shortage, the manager refused an opportunity to obtain 200 cases of peas of this brand since he felt it would antagonize his customers further. One can mention dozens of similar illustrations of brand consciousness, so serious that several national brands will probably be changed. In a few instances, the products under distributors' labels are actually more reliable than the same packer brands available elsewhere. These distributors buy to specification and have a representative present during the packing operations. This, however, leaves an evergrowing backlog of poor quality merchandise in warehouses. I recently heard a statement that a certain western state's warehouses were full of poor quality frozen foods.

U. S. Department of Agriculture continuous inspection service shown grading produce.

The first step in setting up quality grades is to establish specifications for the quality of raw material. Since nature does not follow man-made specifications, some of the incoming raw material may be of lower quality than desired in the finished product. The lower quality should be graded out. Canners have done this for years. Instead of identifying two different grades, the canner frequently packs under two labels, which are sold on grades. It takes fancy raw produce, however, to make a fancy finished product, as all packers will agree.

If a packer really wishes to make a start, he can do the grading himself up to a certain point. In fact, he may in this manner be able to satisfy his customers who distribute his good merchandise, provided, of course, he follows adequate specifications. He can set his own grade on his merchandise or let the distributor do it. Then, when a purchaser wishes to buy according to specifications, it is possible to do so. A procedure similar to this is used for canned products. It will work for frozen products.

Incentive for Growers

The mere act of grading in the factory does not give the grower any incentive to grow a better crop. Grower and packer are seller and buyer. When payment is based on grade, the grader could be a disinterested third party. Asparagus, for instance, has been purchased and paid for by grades for nearly twenty years and the grader has been either a state or federal employee in whom both buyer and seller have confidence.

Perhaps the packer has been given too few practical tools for grading incoming produce. We find him unsuccessful in setting up methods of

payment-by-grades in purchasing many raw products from farmers. The giving of a bonus or a penalty, depending on quality, more often than not provides the farmer no increase in revenue over selling to the packer who does not bother to grade his products at all. Perhaps modern wage-payment technics, which provide incentive bonuses, should be given a trial in setting up farmer-contracts. Farmers will penalize their yields willingly provided they are paid a sufficiently higher price for the better quality product.

Ceiling Prices an Obstacle

The first thing to do about improving quality of frozen fruits and vegetables during this period is to obtain higher ceiling prices on the best quality without penalizing the poor quality. If the advance in retail price is established to enable growers to do a better quality job, the OPA may be quite sympathetic to a justifiable increase.

Two things can be done by the packer to alleviate his dilemma. Should he wish to experiment to see if the farmer-bonus plan will really result in larger volumes of top quality merchandise, and if he is willing to turn back to the farmer 100 percent of the increase allowed by OPA to conduct the experiment, I believe he will receive two surprises. The first will come when OPA acquiesces in becoming a party to the experiment. Number two will come wnen the experiment works.

Objective Grading

Various products lend themselves to different rapid methods of determining quality. Grading of asparagus, for example, is not as difficult a problem as it may at first seem. The greenest spears of largest diameter are invariably of highest quality. The grader takes a handful of spears from each of the lug boxes on the farmer's load and places them in a receptacle where he mixes them well and then measures a definite number of spears for diameter, discarding those showing less than a given number of inches of green. This results in establishing quickly a percentage of product in each of several grades set up as previously agreed upon by both parties. Each grade is sold at a mutually agreed price. The grading is done publicly in front of the farmer. He is allowed to see the company records to ascertain how his own grades compare percentagewise with those obtained for the whole day's pack.

Part of facilities at Frozen Food Foundation for testing products for consumer approval. Research, quality standards, packaging methods are part of Foundation's program.

The American Can Company's tenderometer represents the objective type of grading. It is used on peas and certain other products. In fact, it is such a good visual indication of quality that farmers have greater confidence in its merits than have packers. Although the farmer would trust the packer to do the grading with such an instrument, the packer realizes that sampling is far from fool-proof, and sometimes prefers to use a government grader.

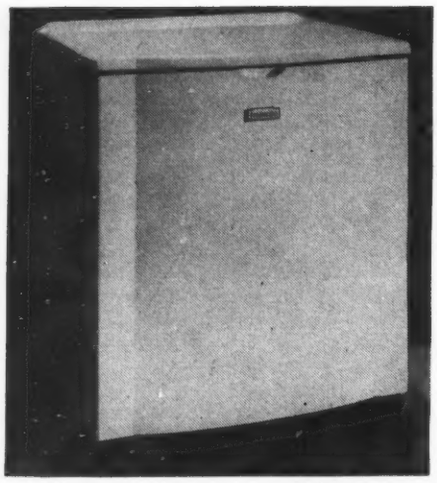
In spite of the fact that all grading of produce cannot be at present done by objective measurements, the USDA's continuous grading service conducted by trained men is perfectly capable of grading produce entering the plant.

Lee,[1] at Geneva, has worked out rapid specific gravity technics. Tressler[2] and others have advocated using the chemical vitamin C (ascorbic acid) titration as a basis for grading green vegetables. The person, however, who can obtain a representative sample and reduce it accurately, from the size of a load to a few grams for a laboratory test, is the person upon whom the grading system depends. It is the lack of satisfactory objective methods and statistical evidence of their value that postpones the general acceptance of government graders. The government could render real service by developing objective grading instruments. If this were done the industry as a whole could embark simultaneously on a grading program.

If the industry will not act as a whole, the movement toward better quality frozen foods will run into difficulty. When frozen green beans become so bad that the Federal Food & Drug Administration has to establish minimum standards as a basis of seizure to protect the public, it is time for the whole industry to decide to do something about quality standards. Let us not wait for the government to step in.

Sanitation Standards

The problem of establishing factory sanitation methods and standards is as important as the question of quality standards. If products ever become public health hazards, then standards will be imposed on the industry. The times are largely responsible for conditions and packers are in a squeeze between high costs and low prices. They cannot be expected to do much about quality if by so doing their costs are raised and they are unable to pass this cost on to the public. Sanitation standards are, nevertheless, a necessary adjunct of any quality control program. The very best grading standards can be nullified by poor sanitation technics. The writer once was greatly surprised to find corn-on-cob actually sour in the packing room before it got into the freezer. After



Frostmaster 3-cu. ft. frozen food home storage box. It holds about 120 pounds.

that experience corn-on-cob went into the freezers as fast as it was wrapped. Peas that overheat in tubs before being washed and blanched take on a flavor that remains in the frozen product, but disappears in the canning process. This is the main reason why so many people still prefer the flavor of canned peas.

Sanitation, thus, has to do with many things besides keeping equipment clean. It covers many factors of plant design, layout, equipment specifications, automatic cleaning devices, cleaning compounds and cleaning methods, as well as product temperature control problems.

Factory Supervision

Two additions to the usual factory routine are accordingly needed. The first is the setting up of a pay-by-grade operation under the supervision of a capable grader, acceptable to both packer and farmer. The second is the addition of a positive sanitation control program in the factory.

Such proposals cannot be adopted easily by a packer who lacks adequate technical services within his own organization. The canner usually leans on the National Canners Association or his can company for help. The frozen food packer may ask a local experiment station to guide him, but the industry is relatively new and experienced technologists are scarce. There are few adequate guideposts. Fortunately, the problem is not too difficult. Quality grading of incoming produce can be supervised by the same person who supervises the sanitation control of the factory. It is a matter of hiring a man, broadly trained in the one technic, and giving him specific training in the other.

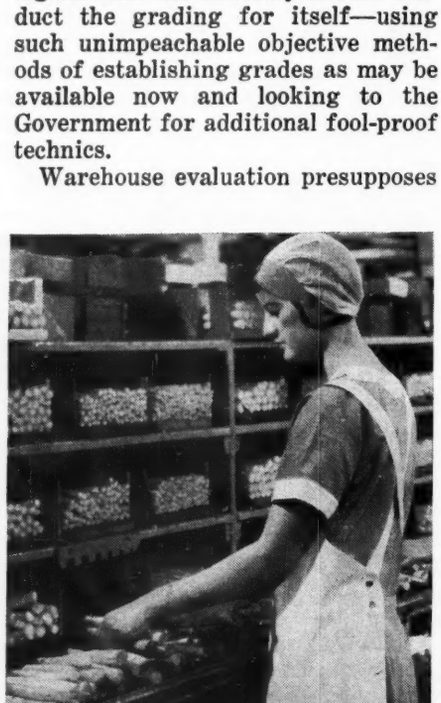
To make such a one-man supervisory system work, it must be streamlined to the nth degree. A supervisory service or organization is needed that can survey the problem, make recommendations, set up the facilities and train or supply the plant quality supervision. Under such a plan, complete quality control can be attained at a minimum of cost.

The remaining job for the supervisory organization is to spot-check, periodically, the quality of the grading and sanitation work at the plant itself, supplemented by warehouse and market checks of the products. The packer can then always rest assured that his products are as good when served in the home as they are when they leave his plant.

Warehouse Loans

Distributors now call upon the Department of Agriculture's field service to inspect frozen foods in warehouses all over the United States and the products are then graded according to "Standards for Grading Frozen Foods," which have been established for 16 frozen fruit and vegetable items. Warehouse loans are based on values established by such grades. Since the cost is passed on to the consumer anyway, it seems logical that the industry should conduct the grading for itself—using such unimpeachable objective methods of establishing grades as may be available now and looking to the Government for additional fool-proof technics.

Warehouse evaluation presupposes some preliminary grade segregation by the packer. Such segregation is second nature to a packer who has been a canner. Yet, under present conditions of financial squeeze between high produce costs and low ceiling prices, there is little incentive to admit of more than a single quality. As a result, quality has a tendency to be too variable to allow such methods of warehouse grading to be representative of actual quality. This single grade may not be poor, but neither can it be good.



Grading of raw asparagus. The largest and greenest spears are highest quality grade.

Private Supervisory Service

The foregoing difficulties were responsible for the establishment of private supervisory quality control services. One of these is the Frozen Food Foundation of Syracuse, N. Y., which was formed to supervise quality for such packers as will furnish frozen foods for distribution through department store members of the foundation. Some of the specific services that it is prepared to render are: Formulation of quality standards, inspection of products and factory, bacteriological research, sanitation control, packaging assistance and testing, warehouse and transportation guidance, and seed testing. It also intends to study methods of objective testing, possibly granting one or more fellowships to institutions showing initiative in this field.

As a result of tests it conducted in Syracuse, N. Y., extending over a period of 2½ years, the foundation found that the annual average of about five dollars' worth of frozen foods purchased per family can, with "saturated selling" and quality control, be raised to over $200 per family. To do this, home storage space is needed. On the test, 240 "Frostmaster" home storage cabinets of 3 cu. ft. capacity were used. The frozen foods were sold over the counter, as well as delivered to the homes. Based on this work, the department store members of the Frozen Food Foundation, with proper quality, expect to do an annual volume of sales in frozen foods of more than $100,000,000 within two or three years.

The members of the foundation will accept any reasonable increase in cost, due to an increase in quality grade, which results from the adoption of quality control standards.

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EDITORIALS

LAURENCE V. BURTON, Editor

You Are On Your Own

SOME Russians are visiting American food industries and, with characteristic Russian manners, are vigorously insistent. If they appear at your place of business and allege that they were sent by Food Industries, please be advised that we did no such thing. The "iron wall" is not conducive to a free interchange of knowledge.

No Coal, No Steel, No Winter Food

THE reason why steel mill stoppage is so great a hazard at the present time to food preservation is that it takes about 2,700,000 tons of steel to supply the can makers. Nearly all the steel for tin cans is made on continuous-strip mills that operate 24 hours a day.

If it should occur that a strike or anything else causes the steel mills to fall behind the needs for tin cans when crops are right for harvest, there is no possible way for them to catch up. A plant or machine that operates 24 hours a day cannot do anymore.

Should any coal miners' families be forced to go without canned foods next winter there will be scant comfort for the women and children in the fact that their men folks struck in April, 1946. Mining towns seldom produce their own food.

Did Lubin Lead Us Astray?

WHEN Dr. Isadore J. Lubin was commissioner of Labor Statistics, about eight years ago, he conducted an academic inquiry into the economic cost of strikes to the nation. He produced a multitude of tables and charts from which he concluded that there had been no economic cost from any strike under his scrutiny. The theory was proposed that a strike merely closed an industry for a period equivalent to a seasonal slump. Ergo: We had just as much mined coal, just as many motor cars and other useful things as if there had been no strike at all. Which, to Dr. Lubin's innocent way of thinking, meant that a strike involved no cost to the economy of the nation.

At the time, his analyses appeared plausible. His facts and figures seemed to prove his conclusions. But in retrospect, it is apparent that he omitted any consideration of the prior state of the economy. He had some facts, but not the truth about the cost of strikes.

In view of his prominence in the U. S. Department of Labor, his conclusions received widespread attention throughout the ranks of organized labor. And high officials in Washington, even the late President himself, were exposed to the Lubin theory and believed it. This may explain the present indulgent attitude of Congress and the Administration toward strikes at a time when the rest of us are hopping mad.

If there be any who still believe the Lubin no-cost-of-strike theory, they will have plenty of evidence to invalidate it in the near future. The true wealth of a nation lies in what it produces to satisfy human wants. Anyone who curtails production in time of need robs everybody.

Senatorial Evasion

BELIEVING that opposition will get us nowhere and that constructive suggestions for positive acts might have some influence, we recently urged Senators Wagner and Meade to "use your energies to secure enactment of a law that will restore moral and legal responsibility to all persons, be they manufacturers, employers or organized workers . . ."

Senator Wagner characteristically declined to reply. Senator Mead answered with a mimeographed form letter on the stationery of the Committee on Post Offices and Post Roads, stating that the Senate Committee on Education and Labor is sitting on "the unhappy situation." Also, that "Members of this committee feel, after much study of the situation, that they must go forward in our traditionally free and democratic method of solving our industrial problems, and while we may have some difficulties, nevertheless, by doing it in this manner we will have at least prevented a situation developing wherein the government would first control and regulate labor, and then move into the possible control of industry, and eventually into the very lives of our citizens."

This, it seems to us, is downright mushy thinking. If there is to be a choice as to who shall control our lives—should it come to that—we prefer the government, in which we expect to have a voice, to being under the domination of autocratic John L. Lewis, James C. Petrillo, Walter Ruether, Philip Murray, et al. This country needs some men with guts in the legislative branch.

Operation Crossroads

THOUGH atomic energy appears to have little immediate application to the food processing industry, it is our intention to keep readers posted on important aspects of this spectacular development. The McGraw-Hill Publishing Company will be represented at the Bikini tests by Philip W. Swain, Editor of *Power*, a trained engineer, who has long been a student of the industrial possibilities of

atomic fission. Three other McGraw-Hill men will also be present in official capacities.

Such reports as Mr. Swain will make will be dependable, hardboiled evaluations of this most recent test of atomic energy, and will not confuse heat and temperature, energy and force. Readers of FOOD INDUSTRIES will not want to miss his appraisal.

How Would You Like to Run It

DURING the war, one firm had a large number of German war prisoners for workers. Now, it has none. But now in their place is a well-organized union. During the war the most primitive methods and equipment were economically possible. At present there is no disposition to modernize and mechanize the antiquated plant. Apparently it will take a strike to awaken the owners to their anachronism. Must be some fun to run this place.

New Freezer Plants Can Be Built

FREEZING PLANTS and frozen locker plants are essential to the health and safety of any community, particularly during the current food emergency. Veterans Emergency Housing Program Order No. 1 seems to prohibit construction of any new facilities of this nature, but we have it from Mr. Wilson Wyatt, who has charge of the VHP, that this is not true.

It is possible to secure an approval and permit to go ahead provided proper authorization is obtained from the appropriate CPA Construction Field office. The latter will determine the essentiality of the project after reviewing all the pertinent facts, size of the plant, its cost, to what extent it may interfere with housing construction for veterans and the state of the food emergency.

While it is not possible to predict the sort of decision to be given, it should be noted that it is not impossible to secure authorization. Those who wish to apply should file Form CPA 4423.

Pros and Cons of Exports

ONE of the smartest ideas in recent months is the reason given by one company for exporting about 20 percent of its production. The company wants to know if it is actually able to compete in a free market — something impossible to ascertain at home under OPA controls. It is not, however, seeking to build its foreign business.

Exporting is a risky business at the present. Just 27 years ago a manufacturer of evaporated milk succumbed to the lure of an extra dollar a case obtainable overseas. When the foreign market dried up in 1921, he discovered that he had lost his domestic market and spent the next ten years trying to win it back.

Export sales have a definite appeal, but require some long headed management decisions in times like these. The home market should never be neglected.

"Vacuum" Is Not a Food Preservative

"VACUUM," as a preservative, seems to be with us again, judging by a sudden flurry of inquiries coming to FOOD INDUSTRIES. Some day we may find it expedient to publish a critique of "vacuum" in this service. Since it would require several pages for an adequate discussion, a mere comment must suffice at this time.

Among people who are not trained food technologists, the idea that vacuum can act as a food preservative sometimes grows to fantastic proportions. About 15 years ago there was on the market a home canning device consisting of a hand pump and a special can top to which it would be temporarily connected. The prospectus for this device said that all the housewife needed to do was to pump out the air and the food would never spoil. Vain hope!

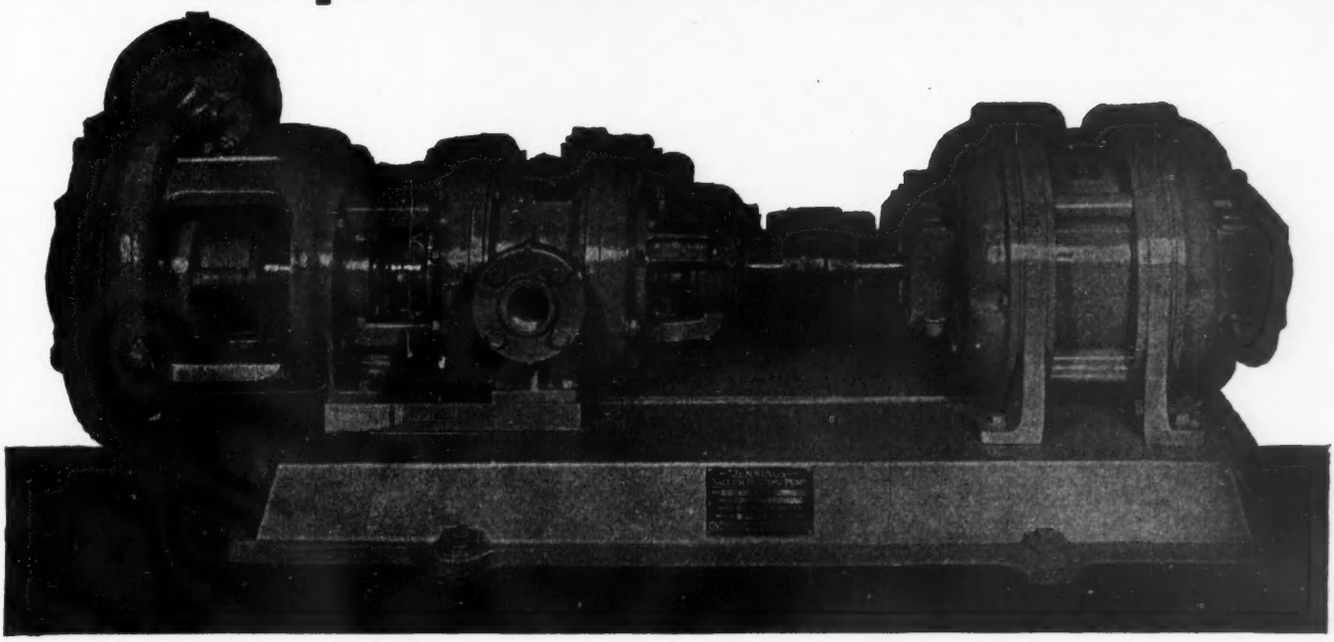
The very word *vacuum* seems to carry a magic technological meaning to the uninformed. Vacuum is very important in the food processing industry but not in the manner some promoters would have the world believe. Vacuum generally refers to pressures below atmospheric pressure. But only in an *absolute vacuum* can the evacuated space be regarded as entirely free from any gas. And absolute vacuums are exceedingly difficult to create—in fact, impossible to create despite the closeness of their approximation.

Generally speaking, a vacuum in a space is attenuated air. By this is meant, air at a pressure of less than atmospheric. There is, however, some air present. Vacuum itself does not stop growth of all micro-organisms that spoil food. Some organisms like certain molds require a definite concentration of free oxygen to grow. Reduce the oxygen concentration below this critical figure and the molds are restrained from normal growth. Some spoilage bacteria, however, require very little free oxygen; others thrive in the absence of oxygen. Thus, you can't get away from bacterial spoilage by packing foods in a vacuum.

Vacuum is not a substitute for a food preservation process like salting, pickling, sugar preserving, canning, freezing or dehydration. It is, however, a valuable supplement to the known processes of food preservation. For it is well known that oxygen is the destroyer of flavor and quality. A fat cannot oxidize if there is no oxygen present to oxidize it.

Hence, vacuum is valuable to help maintain quality in a food that is preserved by some recognized process. While FOOD INDUSTRIES encourages the use of vacuum or any other method that enhances or maintains quality, we deplore any technologically unsound attempts that use it improperly.

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

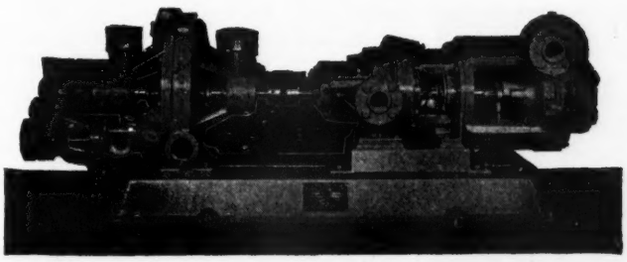


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK • CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

Descriptive Labeling

REALIZING consumers' interest in the ingredients of food products, Atmore and Son, Philadelphia, has incorporated the idea into its new label for Simple Simon Mince Meat.

Brown and yellow are the predominant colors on the face of the label. The back has bright and descriptive information about the ingredients. There is a large piece of mince pie surrounded by individual illustrations of an apple, vinegar, nutmeg, raisins, sugar cane, meat, salt, currants, cinnamon, orange and lemon, sherry wine and grain alcohol.

This 2-lb. vacuum-sealed glass jar of mince meat can be spotted easily by its unique label.

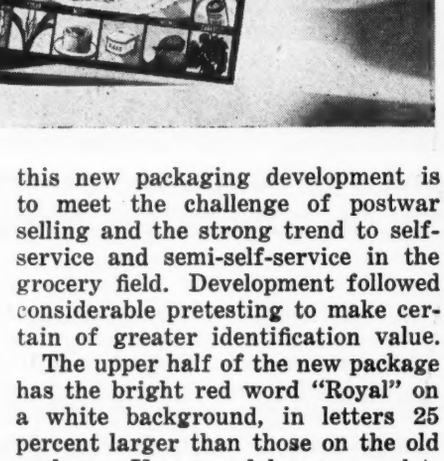
Corn for Popping

CORN, ready-to-pop, is offered by Rustic Glen Foods, Joliet, Ill., in a fiber body container with aluminum foil coated ends. The container is tall and cylindrical and holds 10 oz. Red, white, green and yellow colors are used on the label. Directions for popping appear on the container.

Royal Puddings

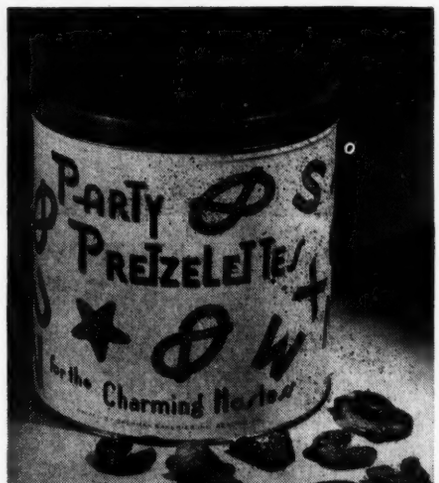
THE three standard flavors of Royal puddings are now being packed by Standard Brands, Inc., New York, N. Y., in bright, new packages. These are simple in design, easy to read, quickly identified, and have won immediate acceptance from the trade and shoppers alike. The object of this new packaging development is to meet the challenge of postwar selling and the strong trend to self-service and semi-self-service in the grocery field. Development followed considerable pretesting to make certain of greater identification value.

The upper half of the new package has the bright red word "Royal" on a white background, in letters 25 percent larger than those on the old package. Upper and lower case letters are used in place of all capitals used formerly, making for better readability. Featured on the lower half of the package is the color that identifies the flavor. Rich chocolate-brown is used for chocolate, sky-blue for vanilla and golden honey-brown for butterscotch.



Cocktail Pretzels

PARTY PRETZELS are packed by Bachman Bakeries, Inc., Reading, Pa., in a new 1-lb. reusable metal container. The small pretzels are manufactured in a variety of designs with alphabetical types predominating. Pretzelettes are made to appeal to the hostess and children alike. Against a white background, pretzels in their natural color and in various designs are scattered around the metal container. When empty, the container can be reused to store flour, sugar, cookies and many other items.



Bachman Bakeries have recently introduced on the market a second new pretzel item called Carmelized Cocktail Stix. This item should appeal to the hostess looking for something new to serve when entertaining. Ingredients include flour, salt, shortening, dextrose, malt, sugar, soda and leavening. The pretzel sticks are put up in attractive metal containers with a red and yellow color scheme. Net weight is 1½ lb.

Beans and Franks

BEANS, with sliced frankfurters and tomato sauce, now are available under the Phillips Delicious brand packed by Phillips Packing Co., Inc., Cambridge, Md.

The 12-oz. can contains soaked beans, beef, pork, water, tomato puree, sugar, salt, onions, spices, sodium nitrite and sodium nitrate.

The beans are light in color and the "dogs" soft in texture.

The Phillips label is printed in red and black. Descriptive information includes size of ean, net contents, cups, servings and directions.

Foil For Frozen Foods

A. D. ATTERBURY Co. of Yuba City, Calif., is employing laminated aluminum foil as an over-wrap for Sierra Snow brand frozen broccoli. This is believed to be the first frozen food processor use of aluminum foil as an over-wrap on frozen food cartons.

The company expects also to wrap this year's pack of Brussels sprouts and baby lima beans in this new foil. The management is optimistic as to the availability of aluminum foil for the entire 1947 consumer packs for

Sierra Snow brand frozen vegetables and Froz-N-Gold frozen fruits.

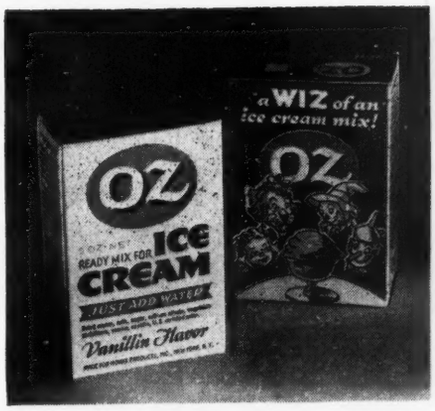
Package design is colorful and attractive. Transparent green is the dominant color and is used as the overall package background. The transparency reveals the beauty of the metallic foil. By reverse printing, several areas show the brilliant color of the foil. The Sierra Snow brand appears on the front and both side panels in a script of plain white against transparent green. Other lettering is in black. A light opaque pastel green highlights the foreground and shadows on the mountain landscape.

The over-wrap is a thin-gage multiple lamination developed by Reynolds Metals Co., Richmond, Va. It consists of a rotogravure-printed foil, laminated to two plies of waxed paper. The sheet is an excellent water-vapor barrier and is unaffected by moisture or juices.

The Frank Wright National Co., San Francisco, is checking consumer reactions and retailer interest.

Fairy Tale Packaging

"Oz," the new name of an ice cream mix, appealing especially to children, was formerly sold under the trade name "Tis." For what is believed to be the first time in the food industry, a manufacturer has purchased the right to the title and characters of a book for a trademark. "The Wizard of Oz" characters, including Miss Dorothy, the lion, the scarecrow and the woodsman are shown on the



carton. Red, white and blue colors are used on the carton.

Regular Ice Cream

The ingredients used in most other ice cream mixes are dehydrated and then mixed prior to packaging. The "Oz" mixture, however, is prepared by making regular fresh ice cream, which is then dehydrated and packaged. Directions for preparing the ice cream in the home require only the addition of water prior to freezing. By mixing in fruits and nuts, delightful flavor variations can be made. The 5-oz. mix is manufactured by Homix Products, Inc., New York, N. Y., and packed in a bleached, plasticized, triplex Lamofilm bag with thermosealing on top and bottom.

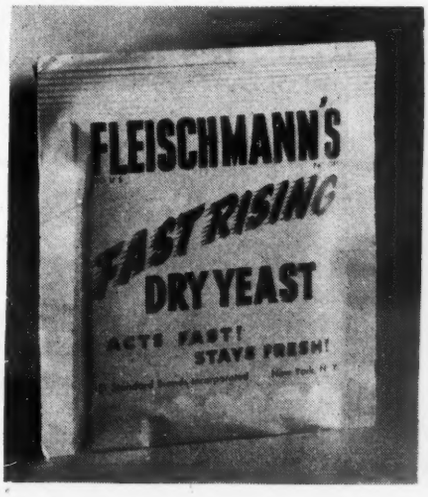
Dated Dry Yeast

FAST rising dry yeast, said to act fast and stay fresh, has been developed by Fleischmann Division of Standard Brands, Inc., New York.

The yeast is dated and requires no refrigeration.

After dissolving in one-half cup of lukewarm water with sugar added, it may be used as fresh yeast.

The yeast is packaged in heat-sealable laminated glassine packets. Each individual eye-appealing packet appears on the store counters in handy display cartons.



Stray Bronze

• Yes! And that piece of stray metal should not be found in your finished product! To eliminate this headache of the cereal and other dry food processors, we have developed a new type stoner better than 99% efficient! Revolutionary in design, it removes stones, glass, NON-MAGNETIC as well as magnetic metal, and other hard, dangerous contaminations from wheat, cereals, beans, and other dry food products with amazing ease. Compactly built, requires little floor space. CAPACITY UP TO 16 TONS PER HOUR! Operation cost as low as 3/5 of 1 H.P. per ton hour! Write for Bulletin FI-646.

SS&S
AIR-FLOAT
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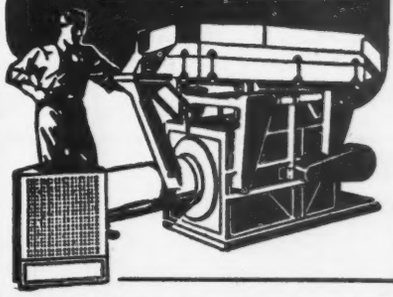

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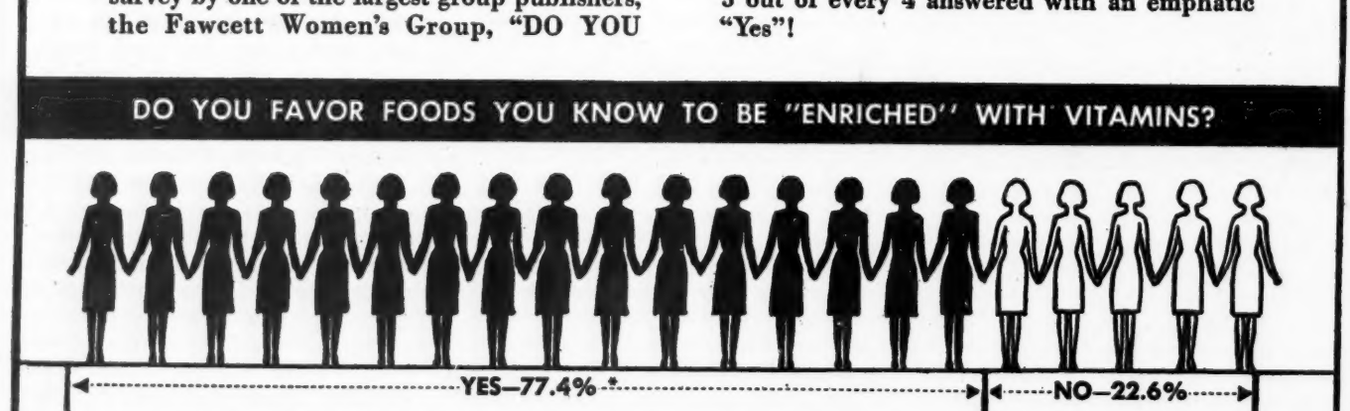
Survey proves... Housewives demand enriched foods

Here's the conclusive proof—from Mrs. America herself! Housewives were asked, in a recent survey by one of the largest group publishers, the Fawcett Women's Group, "DO YOU FAVOR FOODS YOU KNOW TO BE 'ENRICHED' WITH VITAMINS?" Better than 3 out of every 4 answered with an emphatic "Yes"!

*When asked "WHY," 84.9% of these housewives said "better health," "greater vitamin value" or "more nutritious."



(Also from same survey by Fawcett Women's Group)

Thus, in the days of heavy competition ahead, the great majority of housewives will use *vitamin enrichment* as a guide in judging the quality and food value of the products they buy.

YOUR BEST BET: We strongly suggest that you investigate vitamin enrichment for your product by consulting our staff of technical experts.

WRITE TO...

'ROCHE' Vitamin Division

Hoffmann-La Roche, Inc., Nutley 10, New Jersey

FOOD INDUSTRY NEWS

GENERAL

Adequate Supply of Tin Cans Doubtful Despite Official Help

Strikes in steel and coal mining slow production to point where steel is even shorter than the tight tin supply

OUTLOOK for an adequate supply of tin cans to meet the demands of the food industry is dark. The steel industry, first hampered by the strike in the steel mills, had to stop operations again last month because of the strike of the coal miners. Actual manufacture of tin plate did not stop until about the middle of May, when the supply of blooms for the continuous strip mills finally was exhausted.

Operations will be resumed anywhere from two to six weeks after the coal miners return to work on a permanent basis. It will take that long for coal stocks to be built up and steel mills to return to normal operations, the time depending in some measure upon what the mill operators do about repairing their furnaces. If the shut down continues long enough for the furnaces to cool, repair and relining will be undertaken.

The impending shortage of tin cans is definitely a steel shortage at this time. This situation, however, may not last. Tin stocks, although holding their own while steel is in trouble, are expected to decline rapidly once steel production is resumed. Latest reports on conditions in the Orient verify the tight general supply picture previously described in these pages.

Government observers just made a report that tin will trickle toward this country this year and continue in increasing volume until full production is reached some time in 1948. Tin concentrates available to the Texas smelter are not sufficient to keep that facility at capacity operation during the same period, as far as is known now.

In view of these conditions, the recent amendment of the tin can order, M-81, loosening up some of its provisions is without great significance. If the can shortage becomes as severe as predicted by can manufacturers and government officials alike, then M-81 is only a hunting license. There will not be enough cans to go around for even the "A" preference items. Specifically, the amendment of April 23 gave a choice of base periods to packers with quotas of "100 percent" of the calendar years 1941 or 1945, "whichever was greater." While the order was open, a few food and non-food items were added to Schedule 1. These had been omitted inadvertently when the schedule was first made out.

Food Critical Until 1949, Says FAO Head

THE world food situation is likely to remain critical in one way or another for the next four or five years, and there is urgent need to agree on a plan for international action over that period of time.

This warning has been issued by Sir John Boyd Orr, director-general of FAO, in a letter to governments and international organizations that have been invited to send representatives to the special meeting on urgent food problems, in Washington, May 20th.

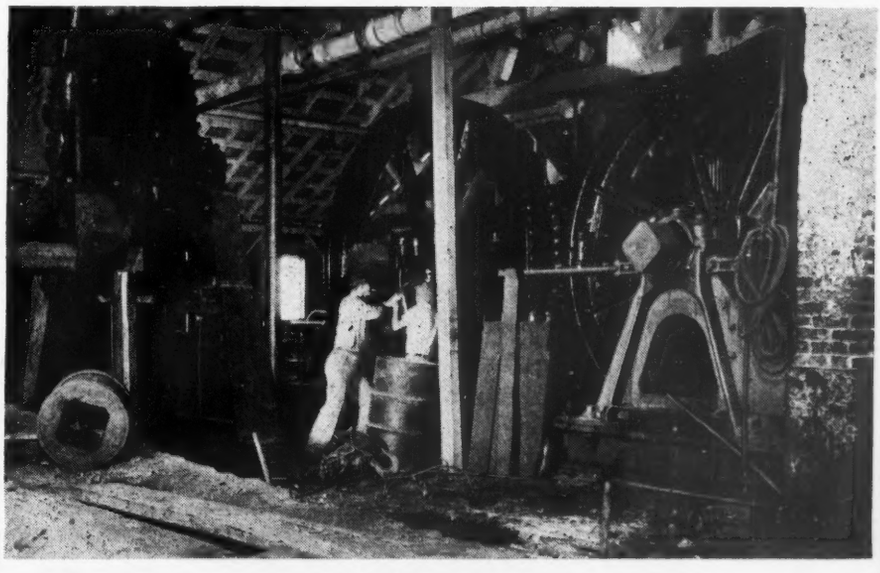
The meeting was convened by the Food and Agriculture Organizations as an outcome of discussions in the United Nations Assembly in London early this year. It was not scheduled to deal with the present phase of the emergency, which is being handled by existing agencies, but expected to look ahead to the winter of 1946-47 and 1947-48.

A preliminary estimate of world food needs and supplies for 1946-47, which accompanies the director-general's letter, makes a stark forecast of the situation.

Europe's Food Supply Cut by '45 Drought

WERE it not for the severe and widespread drought that hit Europe's 1945 crops, the decline of European agriculture during World War II probably would not have been any greater than during World War I, according to Naum Jasny of the Office of Foreign Agricultural Relations, writing in *Foreign Agriculture.*

This would have been true, despite the greater severity and longer duration of World War II, he says, because of the progress made in planning of farm production and the greater emphasis placed on the im-



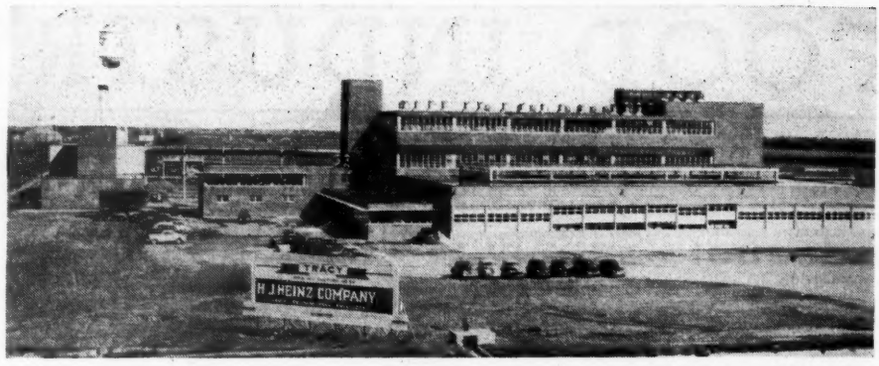
SUGAR MILL TO MEXICO

Purchased by a group of Mexican sugar operators, this sugar plant near Baton Rouge, La., is being prepared for shipment below the border. Workmen have just started to dismantle one of the grinding machines. Louisiana had 307 mills in 1900, only 64 in 1945.

portance of an adequate food supply, especially by the military.

Countries that suffered more in this war than in the last are listed as Italy, Greece, Finland, Hungary, the Netherlands and possibly Poland. Those suffering less were Denmark, Belgium, France, Czechoslovakia, Sweden, and probably Yugoslavia and the western occupation zones of Germany. In the Russian zone of occupation in Germany and Austria, and in the other countries of continental Europe, the picture either seems to be about the same as in 1919, or adequate statistics are lacking.

In Russia, if the declines are taken to the lowest points, damage probably was smaller than in World War I, when the decline was at least 40 percent. The only nation doing far better was the United Kingdom, where production declined in World War I, increased in World War II.



NEW HEINZ PLANT

This new Heinz plant, at Tracy, Calif., was opened late in April. It is on a 73-acre site and has 225,000 sq. ft. of floor space. The plant will have a heavy production schedule of baby foods and will also produce tomato products. It will employ 1,500 eventually.

Stanford U. to Study War's Food History

STANFORD UNIVERSITY Food Research Institute, Palo Alto, Calif., has received a grant of $300,000 from the Rockefeller Foundation to finance the preparation and publication of an international history of food and agriculture during World War II. Studies of international commodities, organization and control and national management will be incorporated in an estimated 20 volumes.

The history will seek to lay groundwork for continuing peacetime analysis of commodities, commodity markets, and the use of land and manpower in agricultural production. The development and operations of the Combined Food Board, U.N.R.R.A., and its predecessors, the British-American Blockade Committee, the Middle East Supply Center, and kindred World War II organizations will be studied.

Merrill K. Bennett and Joseph S. Davis of Stanford will direct the research.

"OH COME NOW, J.P., OUR STUFF ISN'T THAT GOOD!"

Fish & Wildlife Names Two Division Chiefs

DR. GUSTAV A. SWANSON has been named chief of the wildlife research division of the U. S. Fish and Wildlife Service, and George Hamilton has been appointed chief of the service's power division, operating and marketing branch.

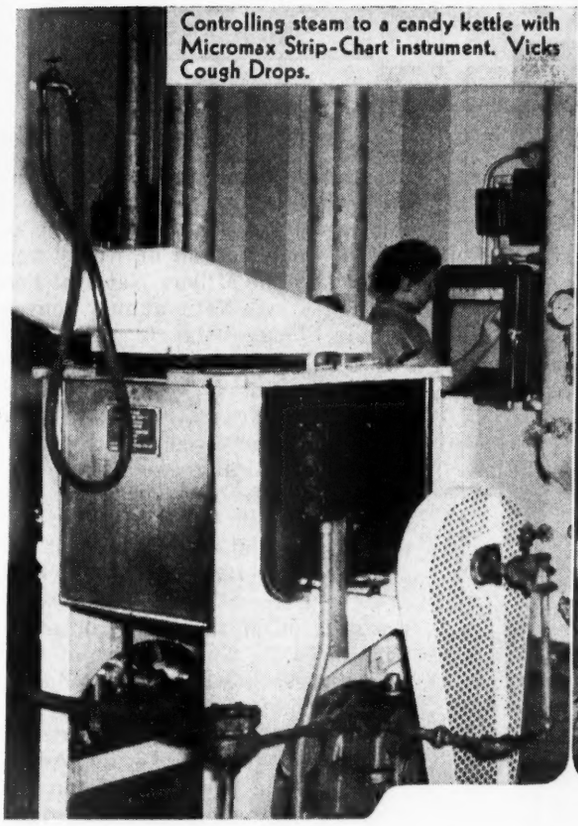
Dr. Swanson, 36, is a native of Minnesota, and has been active in wildlife management for the past 10 years. Mr. Hamilton has been a hydraulic and engineering consultant on several major projects, including the TVA, the Bonneville Power Administration and the New York Power Authority.

Missouri Farm Co-op Plans New Milk Plant

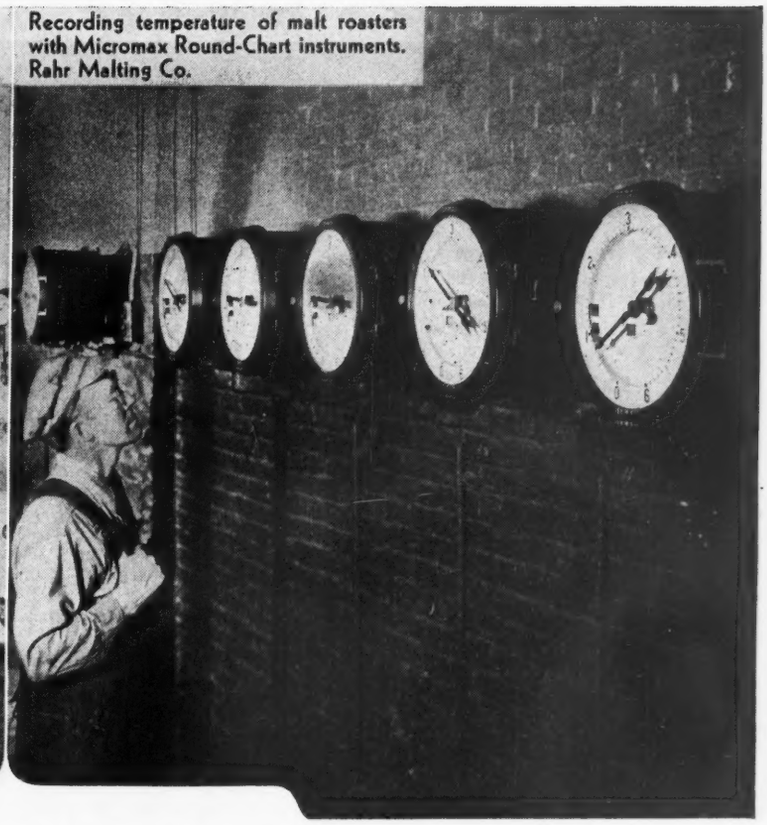
MISSOURI FARMERS ASSOCIATION has started a drive for $486,000—40 percent of the total amount needed to build a new MFA milk plant in Monett, Mo., J. T. Powell, MFA field representative, who will direct the campaign, announced in May.

Powell said the money will be raised from farmers and business men by issuing certificates of indebtedness, which will be payable 25 years from date sold, bearing 5 percent interest.

Estimated cost of the new plant is $1,216,000. The remaining 60 percent will be financed through the Bank for Cooperatives in St. Louis, according to Powell.



Controlling steam to a candy kettle with Micromax Strip-Chart instrument. Vicks Cough Drops.



Recording temperature of malt roasters with Micromax Round-Chart instruments. Rahr Malting Co.

MICROMAX { INDICATORS AND/OR RECORDERS AND/OR CONTROLLERS } ARE GOOD WORDS TO ADD TO YOUR INSTRUMENT VOCABULARY

Here are some of the principal conditions under which it pays food-processing plants to use Micromax Recorders and Controllers in temperature-regulating problems:

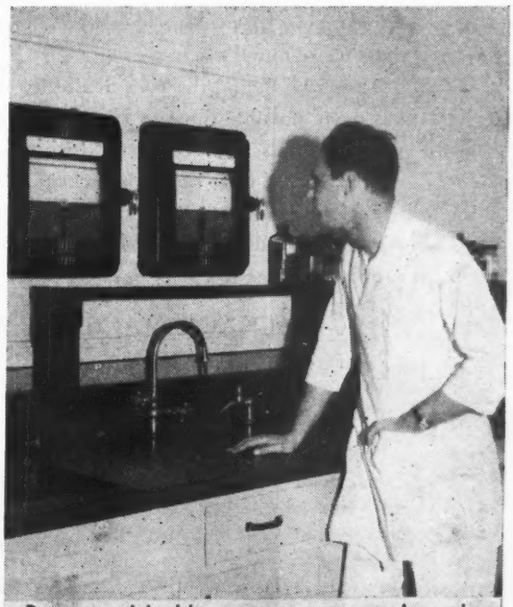
There's an instrument model for any need: (1) Recorders with or without automatic control; (2) Controllers which also indicate, but do not record; (3) Indicators which neither record nor control. There's a Temperature-Detector for every range and service condition. Selection is greatly simplified by this wide choice.

Multiple-point Recording. As many as 16 temperatures can be recorded by one Micromax.

Balance Method Maintains Accuracy. Manufacturing and power plant departments have benefits of same principle the lab uses for dependable accuracy, embodied in powerful, fully-automatic industrial Indicators, Recorders and Controllers.

No Recalibrating. Temperature-detecting units, and their wires to the Instruments, are repaired or replaced on the job. It's never necessary to return a Micromax to the factory for calibration.

An L&N engineer will send catalogs, or call if you prefer.



Process and building temperatures are shown by these Micromax Strip-Chart instruments. Chas. Pfizer & Co.

LEEDS & NORTHRUP COMPANY, 4912 STENTON AVE., PHILA., PA.

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MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES

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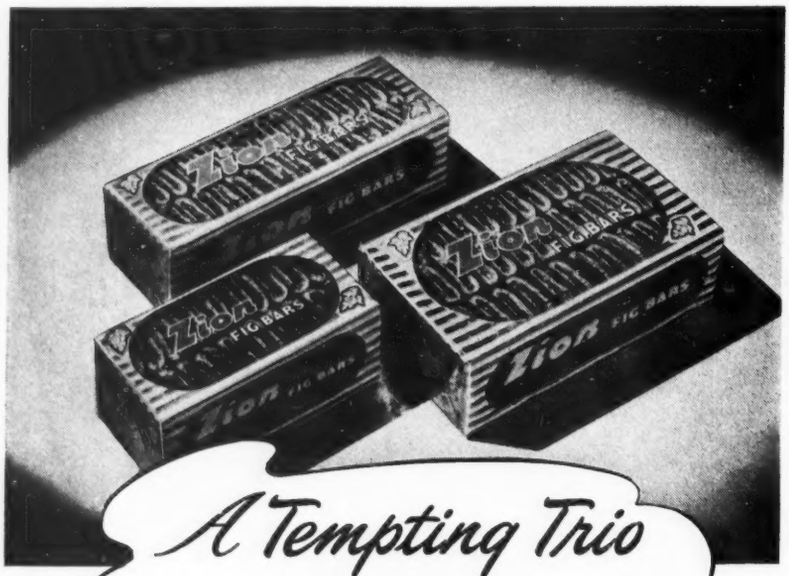


A Tempting Trio

GIVEN A SALES-WINNING WRAP ON OUR MODEL FA

We think you'll agree that these packages of Zion Fig Bars are just about "tops" when it comes to tempting the appetite — for they display the goods in a most enticing manner. The attractive and colorful cellophane wrap has an air of quality, too, that cannot fail to build consumer preference.

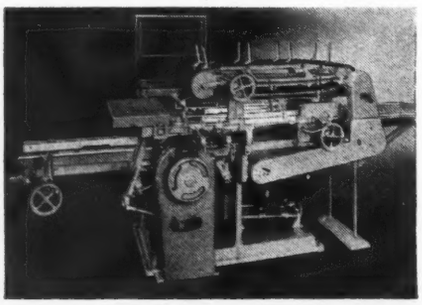
Like so many other food manufacturers who demand perfection in wrapping, Zion Industries, Inc. of Zion, Ill., have consistently relied on our FA models. They were, in fact, among the first users of these well-known machines.

They have found the FA's flexibility a decided advantage, for it has made possible the easy adoption of new and improved wrapping materials. And, of course, its quick adjustability permits the wrapping of a wide range of package sizes.

Perhaps you have a product that would benefit by the superior wrapping produced on the FA. Why not ask our nearest office to supply complete information?

PACKAGE MACHINERY COMPANY
Springfield 7, Massachusetts

30 Church Street, New York 7 • 111 W. Washington Street, Chicago 2
101 W. Prospect Avenue, Cleveland 15 • 849 Marietta Street, N.W., Atlanta 3
443 S. San Pedro Street, Los Angeles 13 • 18 Dickens Avenue, Toronto 8



THE MODEL FA is quickly adjustable for a wide range of sizes. Can be adapted to virtually any plain or printed wrapping material.

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

PROCESSING

Millers' Federation Probes Wheat Cut

RESOLUTIONS opposing the 80 percent extraction order, protesting the payment of subsidies and urging the export of flour instead of wheat were adopted by the Millers National Federation, at its 44th annual convention, in Chicago, May 14 and 15.

W. P. Bomar, president, Bewley Mills, Ft. Worth, Texas, and president of the federation, stated that the industry is faced with the problem of determining what it can do to aid in the present world-wide food crisis and with the problem of putting its own affairs in the best possible order to face future, as well as present problems. As a step towards the solution of the first problem, he announced the appointment of three committees to study the production and distribution aspects.

Robert H. Shields, administrator, Production and Marketing Administration, and president, Commodity Credit Corporation, USDA, reviewed the general wheat situation and presented the 1946-47 crop year program on the basis of an 80,000,000-bu. carryover and a 1,000,000,000-bu. 1946 crop. Of this 1,080,000,000 bu. of estimated total supply, 450,000,000 bu. are to be for domestic milling and food use, as compared with 500,000,000 bu. for 1945-46 and 559,000,000 bu. for the 1944-45 crop year; 150,000,000 bu. for feeding purposes, as compared with about 300,000,000 bu. for 1945-46 and 289,000,000 bu. in 1944-45; 85,000,000 bu. for seed use and about the quantity used for the 1946 crop; 2,000,000 bu. for industrial uses as compared with 20,000,000 bu. for 1945-46 and 82,000,000 bu. for 1944-45; 250,000,000 bu. for export either as wheat or as flour as compared with 400,000,000 bu. scheduled for export by July 1 and about 140,000,000 bu. for a July 1, 1947, carry-over as compared with 80,000,000 bu. for July 1, 1946, and 281,000,000 bu. for July 1, 1945.

He outlined the other phases of the 1946-47 wheat program to be:

1. Not more than 250,000,000 bu. of wheat to be available for export from the United States and allocations to be made as soon as possible.

2. The 80 percent extraction provision in WFO 144 to be continued during 1946-47 marketing year.

3. Wheat used to make flour for domestic use to be limited to the quantity necessary to make 85 percent as much flour as was distributed for domestic use in the corresponding

FOR ALL THESE SERVICES...

Cut away view of a Walseal Tee showing ring of silver brazing alloy and completed Silbraz* joint.

- **HOT AND COLD WATER** circulating systems
- **BOILER FEED LINES**
- **STEAM RETURN LINES**
- **CONDENSATE LINES**
- **LOW AND HIGH PRESSURE AIR** piping systems
- **LUBRICATING OIL** circulating systems where filters and coolers are used.
- **INDUSTRIAL GAS** piping, such as oxygen, nitrogen, argon, helium, etc. throughout laboratories.
- **SOLVENT PIPING** carrying solvent into process and away from process through recovery equipment.
- **VACUUM PIPING** systems

specify

SILBRAZ ★ JOINTS

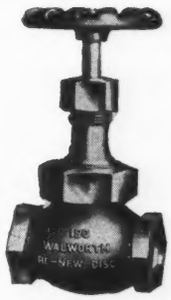
MADE WITH WALSEAL* PRODUCTS

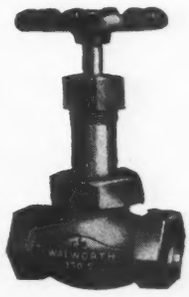
Yes, on tough jobs like these, where brass or copper pipe or copper tubing is used, Walseal bronze valves, fittings, and flanges do a two-fold job.

1. They make leakproof, trouble-free connections that are permanent . . . vibration-proof, corrosion-resistant — connections that will not creep or pull apart; that literally join with the pipe to form a "one-piece pipe line."

2. They eliminate the need for maintenance and costly repairs — especially important where lowered operating costs are imperative.

For these reasons more and more piping installations are being made with the modern Silbraz joints, using Walseal products. For complete details on Walseal products, write for a free copy of Walworth Circular 84.


No. 95WS — 150-Pound Bronze Globe Valve with Renewable Disc, Lock-on Disc Holder, and Walseal Ends.


No. 225PWS — 350-Pound Bronze Globe Valve with "500 Brinell" Plug Type Seat and Disc, and Walseal Ends.

Walworth also manufactures a complete line of bronze, iron, and steel valves and fittings. A detailed description of the entire line is included in Catalog 42. Write for your free copy today.

*Patented—Reg. U. S. Pat. Off.

Make it a "one-piece pipe line" with WALSEAL

WALWORTH

valves and fittings

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EFFECTIVE INSECTICIDES

West's VAPOSECTOR FLUID is a *concentrated* insecticide with a high killing efficiency and is economical and highly effective against flies, roaches, mosquitoes, ants, fleas, crickets, spiders and many other insects.

West's GRAINOSECT is an excellent *contact spray* adaptable for use in food factories, dairies, bakeries, warehouses, flour mills and similar establishments where absence of chemical odors is essential.

NOTE: The West Disinfecting Company also manufactures combination D.D.T. and Pyrethrum Sprays.

WEST INSECTICIDES may be dispensed by hand or automatically with the WEST MISTORIZER. Automatic... Simple to operate. Just fill... and turn on the switch. No further attention required. Can also be operated manually directing the insecticide wherever required.

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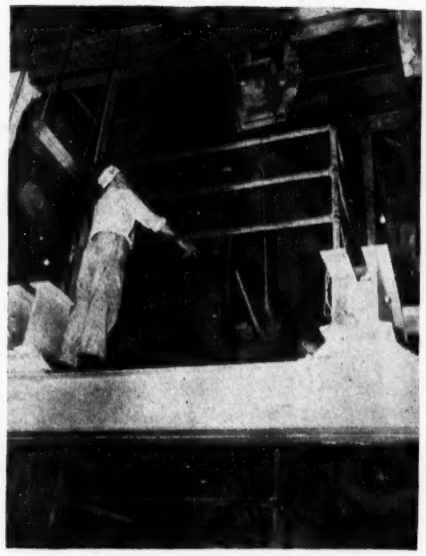

FLOUR MILL HALTS
The six-story belt drive that turns the wheels of Pillsbury's "A" mill, at Minneapolis, is stopped for the first time in 66 years because of the lack of wheat. The mill came to a halt at midnight, Saturday, May 11.

month of 1945—by amendment to WFO 144, effective July 1.

4. WFO 144 to be amended to require that one-half of all wheat delivered to an elevator be offered for sale to the elevator, instead of all being held in storage for the producer, that one-half of all wheat purchased from producers by country elevator operators, merchandisers or other commercial buyers be set aside for sale to the CCC, and that the amendment be in effect until 250,000,000 bu. of 1946 crop wheat be acquired to cover export quota.

5. Office of Defense Transportation to issue a service order prohibiting shipment of wheat out of Oklahoma, Texas, New Mexico, Arkansas, and Louisiana except for export or by special permit.

6. Further limitations to be placed on the use of wheat by feed manufacturers by WFO 144 amendments as soon as general feed grain situation sufficiently improves.

7. Provisions of WFO 66 and 141, prohibiting use of wheat and wheat products for beer and alcohol making, to be continued.

8. Wheat inventory provisions not to apply to 1946 crop wheat unless inequitable distribution necessitates such action.

9. Voluntary conservation program including cut in weight of bread loaves and rolls to be continued.

Elmer W. Reed, vice-president, Shellabarger's, Inc., Salina, Kan., reported a great scarcity of cars for handling the 1946 crop. At the present, 1,600 boxcars are being used daily to move certification wheat from the Northwest area to export points, but Eastern railroads are able to supply only 1,000 cars daily for the shipping of this wheat. Harvest-

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THE BEMIS BOOK ON MULTIWALL PAPER SHIPPING SACKS TELLS HOW YOU CAN GET...

1. Better, low-cost packaging
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4. Faster, more economical handling
5. Finer, more legible brand printing

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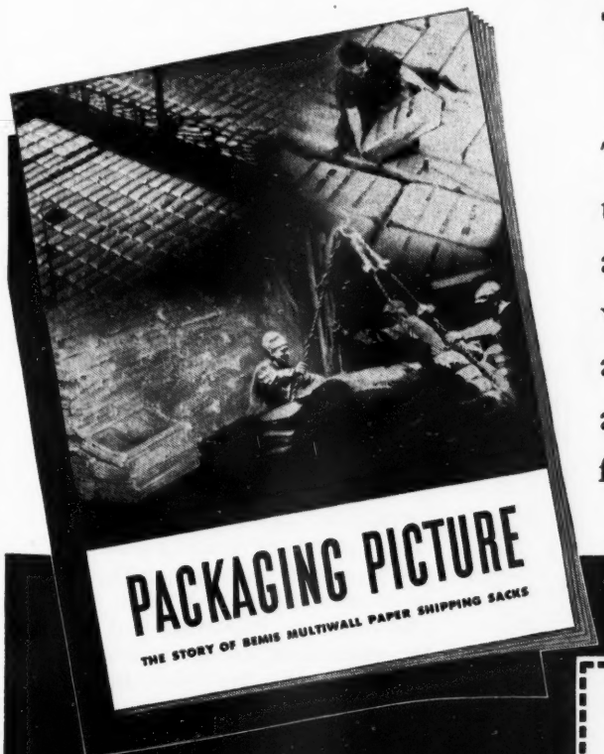

The Story of BEMIS Multiwall Paper Shipping Sacks

This new 16-page book—largely pictorial—shows how Bemis Multiwalls are made . . . how you can use these versatile shipping containers most advantageously . . . how Bemis Packaging specialists can help you. You'll find it interesting as well as beneficial.

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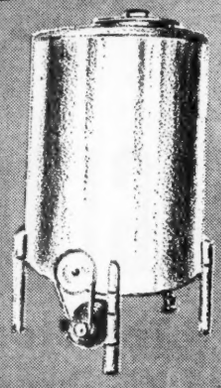
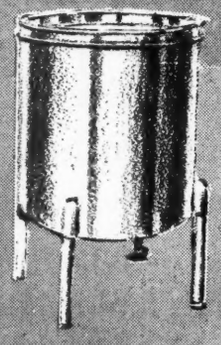
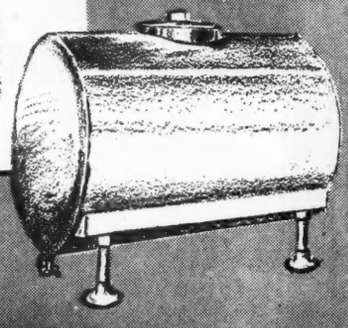
DO YOU HAVE A STORAGE or Processing PROBLEM to solve Economically

See the SAN-I-TANK First!







FABRICATED OF 18-8 STAINLESS STEEL—

Tanks are all welded construction finished with No. 4 polish on inside and bright finish outside.. All inside welds are ground smooth and polished. The Stainless Steel construction throughout assures you of a rust-proof, acid-resistant, easy-to-clean tank that will speed up and increase the efficiency of your processing or storage operations.

MANY MONEY-SAVING FEATURES—

San-I-Tanks have special self-draining features with specially formed bottoms sloping to the front. Engineered to give maximum performance and many years of extra use—meaning savings for you—all at no higher cost. Designed primarily to meet EVERY storage or processing need—you will find the San-I-Tank complete in every detail.

MANY SIZES IN STOCK—

San-I-Tanks are made in a wide variety of sizes, shapes and capacities. By manufacturing a so-called "standard line" we can increase our tank production and pass on the savings made to you. If you need a tank get our complete catalog first and in most cases you will find the tank that will exactly meet your requirements.

SPECIAL TANKS—
Consult Our Engineers

For your convenience we have available a complete engineering service to design and recommend the best tank for use where a standard San-I-Tank will not meet your requirements. If you have a special tank problem send us the data, and let our staff solve it for you.

WRITE for Detailed Information about these TANKS . . .

METAL-GLASS PRODUCTS CO.
BELDING, MICHIGAN Dept. F1

ing and threshing are beginning in the southern part of the hard winter wheat area with only 4,067 boxcars in the area and a promise of 10,000 more when harvest got under way. Normally 25,000 to 30,000 cars are needed to move the wheat from this Southwest area.

Representative August H. Andresen of Minnesota, in his address on "Present and Future Outlook Between Business and Government," stated that the trend towards inflation can be stopped and that the solution of industrial problems can be aided by effective governmental action.

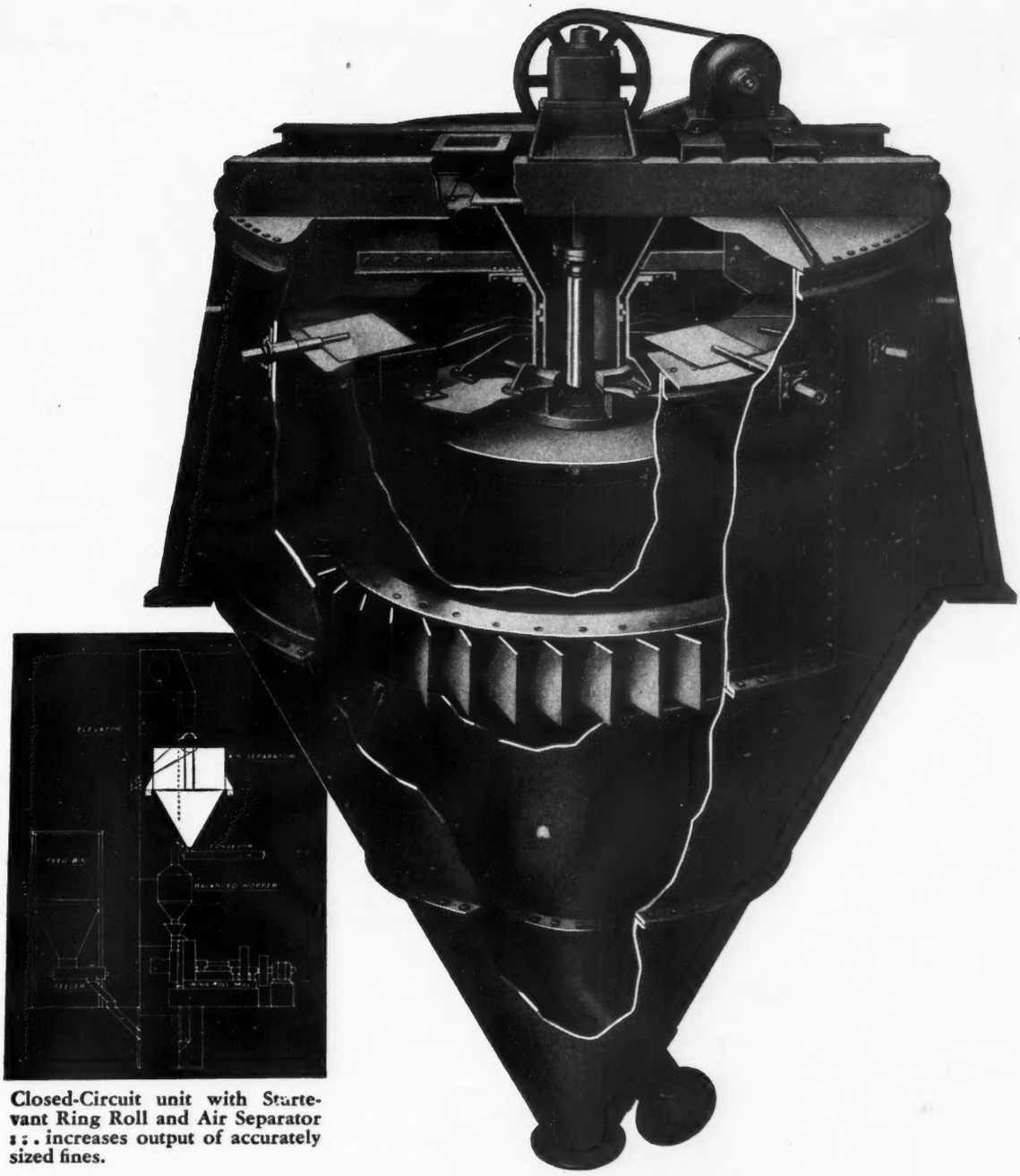
Cereal Chemists Hear Problems Discussed

REPORTS on studies of corn wet-milling technics, starch chemistry, various micro-methods, enzyme activity measurements, baking chemistry and fats and oils chemistry in connection with baking, were prominent on the program of the 31st annual meeting of the American Association of Cereal Chemists, at Niagara Falls, Ontario, May 13 to 16. A record breaking total registration of 489 indicates the wide interest in the problems connected with the cereal field.

A highlight of the program was the symposium on milling and baking problems of the 80 percent extraction flour. In the milling of the flour, the most difficult step is going from 78 to 80 percent extraction. The heavier and plumper wheats are easier to mill to the higher extraction level. Selection of the proper type of wheat is the most important factor in the successful milling of the 80 percent extraction.

D. W. Kent-Jones, London, England, said the English have been successfully milling soft wheat as well as the hard wheat flours to 85 percent extraction. They found milling at lower moisture contents advantageous. The releases on the breaks have been stepped up also. He emphasized the importance of getting the extraction out at the head of the mill with the first few breaks instead of trying to get it out at the tail of the mill. It has been found advantageous to use more breaks, thus making the milling a longer operation.

It was brought out in discussion that eighty percent extraction flour used in the cake baking requires a pH of about 5.4 for improved texture rather than the previously used pH of 4.92. The color difference is apparent but not significant. The volume is down slightly but can be regained by reducing the sugar 10



Closed-Circuit unit with Sturtevant Ring Roll and Air Separator ... increases output of accurately sized fines.

STURTEVANT AIR SEPARATORS

Up Production of Fines . . . Provide More Uniform Fines . . . at Lower Cost per Ton

Do your requirements call for accurate separation of fines . . . at increased production rates . . . at lower costs—then you should investigate the Sturtevant Centrifugal Air Separators. These efficient separators may be used for removing dust from materials already milled or in their natural state . . . or in a "closed-circuit" with a grinder where they separate and remove the finished product from the pulverizer.

Sturtevant Air Separators are easy to operate. Quick, simple adjustments provide a range of fineness from 40 to 350 mesh. They increase finished product output up to 300% . . . cut power costs as much as 50%. Sturtevant Air Separators are the only separators quickly adjustable to meet all requirements for accurate separation under all conditions. They are available in capacities from ¼ ton to 50 ton per hour. Write for complete information and bulletin 087, today.

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Designers and Manufacturers of
CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS
MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

OVER HALF A CENTURY
OF KNOWING HOW
1890-1946

CRCO CONFIDENCE
... born of experience

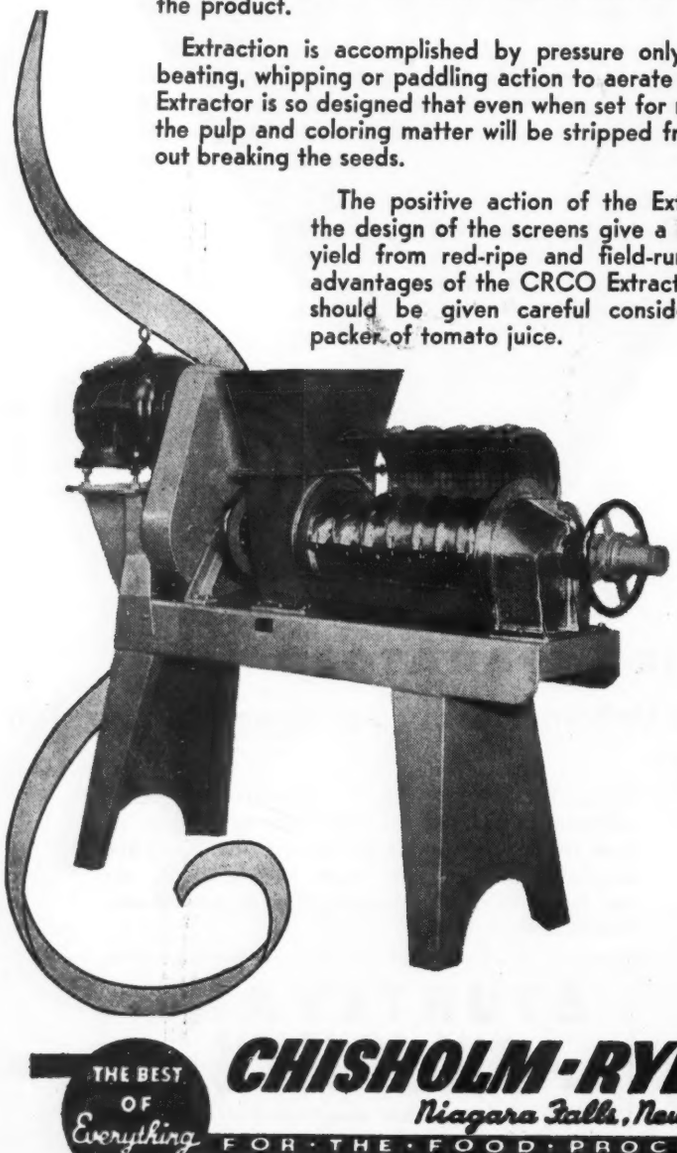
CRCO-American EXTRACTORS

Give Maximum Efficiency in Any Juice Line

CRCO-American Juice Extractors will give from 75% to 90% recovery of tomato juice at capacities up 60 gallons per minute, depending on the model of Extractor and the condition of the product.

Extraction is accomplished by pressure only, there being no beating, whipping or paddling action to aerate the product. The Extractor is so designed that even when set for maximum recovery the pulp and coloring matter will be stripped from the skins without breaking the seeds.

The positive action of the Extractor screw and the design of the screens give a much higher color yield from red-ripe and field-run tomatoes. The advantages of the CRCO Extractors are many and should be given careful consideration by every packer of tomato juice.



WRITE FOR BULLETIN

THE BEST OF Everything

CHISHOLM-RYDER
Niagara Falls, New York
FOR · THE · FOOD · PROCESSOR ·

SAVE BREAD

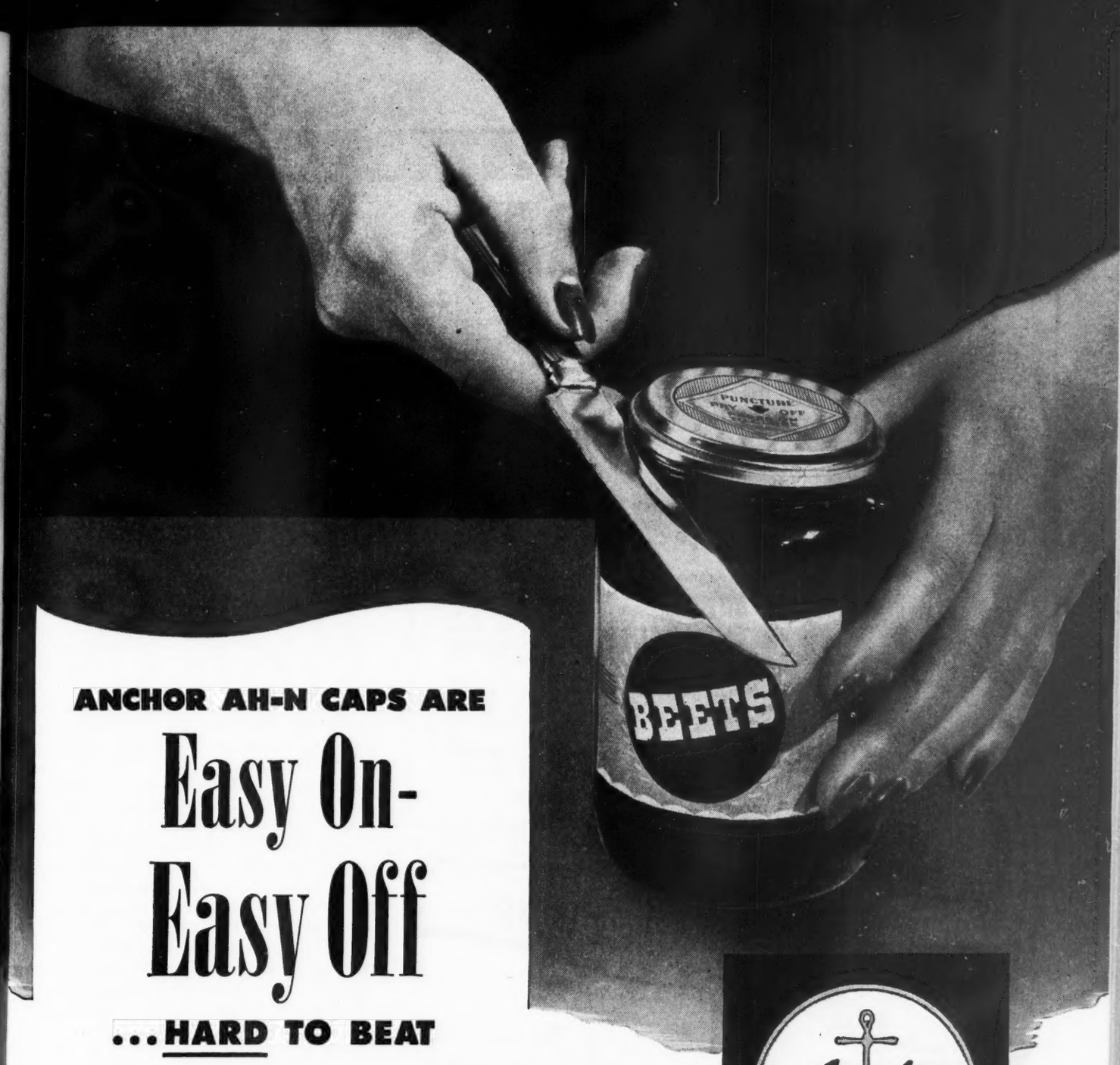
Flour, for the first of the British "diminished" loaves, goes through the automatic weighing machine at this London bakery. Reduction in size of loaves, from 2 lb. to 1¾ lb., was decreed as part of the nationwide campaign to conserve food for the famine-stricken areas.

percent, by adding more eggs to the formula, or by a 8 to 10 percent reduction in the total moisture content.

T. J. Schoch, Corn Products Refining Co., Argo, Ill., discussed the theory of the fractionation of starch, to include two types. The *A* fraction is linear in structure and the *B* fraction is a large ramified molecule. The *A* fraction is the precipitated portion while the *B* fraction is stable in solution. Technological uses for the *B* fraction include the sizing of paper and textiles and emulsification. The characteristics of the various types of starches depend upon the proportions of the *A* and *B* fractions within the molecule.

J. T. Otterbacher, Corn Products Sales Co., Chicago, enumerated the various uses of products of wet corn-milling. The modified starches and dextrins are used as flour improvers. They also help improve sticky doughs, act as stabilizers and gelatinized starches. Dextrins are used for glues in cereal packages. New high-sweetening type sirups are used up to 50 percent in crackers and cakes. Some bakers include up to 7 percent sirup in bread and also use these sugars as a complement to other sugars.

In a discussion of the component parts of the corn kernel, F. R. Earle brought out that an inducement to the farmers to grow corn, high in oil content, is to pay them a bonus to raise it or to develop a variety easy for the farmers to raise. Hybrid corn has not changed the overall constitution of the grain or the percentages of the component parts that



ANCHOR AH-N CAPS ARE

Easy On-
Easy Off

...HARD TO BEAT

AH-N Caps are popular with housewives because they are easy to remove and reseal. They're popular with packers, too, because of the ease and speed with which they may be applied—up to 500 a minute. These features, together with the dependable airtight, liquid-tight or vacuum seals they provide, make them hard to beat for practicability and trustworthy service.

AH-N Caps seal on the straight side of the bottom half of the glass finish, where uniformity is greatest. A soft, thick, pliable gasket insures successful sealing within a wide range of glass finish tolerances. Applied with Anchor Sealing Machines, AH-N Caps are the answer to the demand for greater speed on the packaging line, greater convenience in handling and positive assurance of perfect sealing.

Listen to ANCHOR HOCKING'S HOBBY LOBBY
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Anchor
CONTAINERS and CAPS

PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
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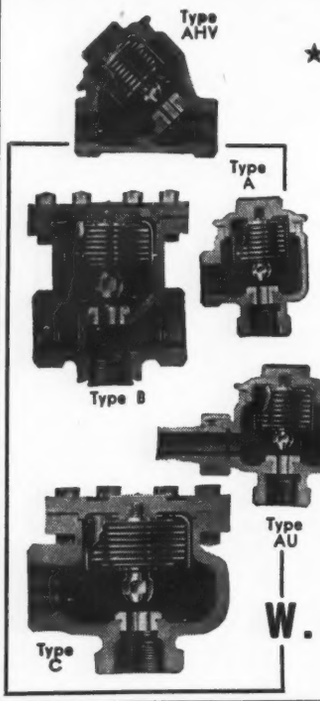
Anchor AH-N Cap

Plant tests show these

NICHOLSON TRAPS



HAVE

2 to 6 Times More Discharge Capacity

PLANT RECORDS show that installations of Nicholson thermostatic steam traps have increased production of steam-heated processing units as much as 30%. Pick out some "problem" lines and apply Nicholson Traps. See for yourself why they're well-known for speeding up steam circulation. For other exclusive features send for Catalog 444 or see Sweet's.

W. H. NICHOLSON & CO.

193 OREGON ST., WILKES-BARRE, PA.

Short-Cut to Floor Cleanliness!

For your dirtiest floors, for the floors that are hardest to clean, get quick-action, thorough Metso. In food plants from coast to coast it cuts cleaning time, saves labor, insures floors that are free of grease, oil and dirt.

Metso works more efficiently because it saponifies both animal and vegetable fats, disperses solid dirt where mold and bacteria lurk.

Metso is a safe short-cut for floor cleaning. Specify it on your next order.

Philadelphia Quartz Co., Dept. D, 125 S. Third St., Phila. 6, Pa.

Sodium Metasilicate U. S. Pat. 1898707

metso Cleaners

run about 5.6 percent in the whole corn and 5 percent in the germ.

Jan Micka, United Biscuit Co. of America, Chicago, emphasized the importance of the pH factor in soda cracker baking. If the range of pH is from 4.0 to 4.2, good crackers can be produced. An abnormal rise to about 8.4 pH during baking makes a poor product. This is the result of the reaction between the metal ions and protein.

Holger Jorgensen, Dansk Gaerings-Industri, Ltd., Copenhagen, Denmark, related Denmark's difficulties with the use of pure rye flour for baking bread. The loaf rose normally in the baking, but was hollow on top and a pasty mass was at the bottom of the loaf. The addition of HCl greatly improved the texture of the loaf by lowering the diastatic power. Baking powder plus yeast can be used without adding any acid to produce the same effect.

In a discussion of shortening action on bakery production performance, W. G. Epstein, Doughnut Corp. of America, Ellicott City, Md., emphasized that frying shortenings must be considered an integral part of the finished product, rather than as a simple frying medium. Characteristics of shortening used in dry mixes such as degree of hydrogenation must be definitely established.

Officers elected were: president, Paul Logue, Monsanto Chemical Co., St. Louis Mo.; vice-president or president-elect, R. M. Sandstedt, University of Nebraska, Lincoln, Neb.; secretary, F. R. Schwain, Kroger Baking Co., Columbus, Ohio; treasurer, John S. Whinery, Rodney Milling Co., Kansas City, Mo., reelected; editor of Cereal Chemistry, W. F. Geddes, University of Minnesota, Minneapolis, Minn.

The recipient of the Osborne Medal was Dr. J. C. Baker, Novadel-Agene Corp., Newark, N. J.

QMC Forms Institute To Study Food Needs

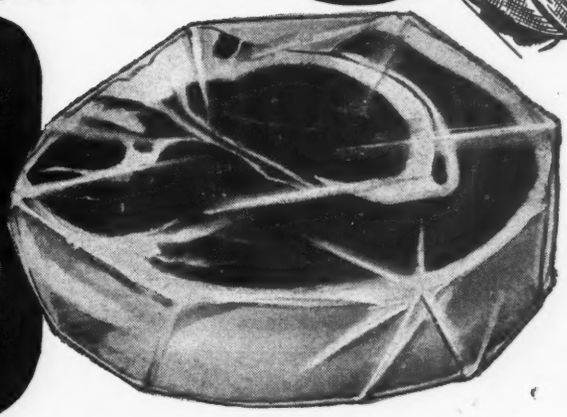
THE Quartermaster Food and Container Institute for the Armed Forces, formerly known as the Subsistence Research and Development Laboratory, Chicago, Ill., is reorganizing its research and educational program to fill present-day peacetime needs.

The Institute is under the direction of Colonel Charles S. Lawrence. Heads of various divisions are: Maj. George Gelman, technical director; Lt. Col. Don L. Deane, chief, food and commodity development division; Lt. Col. Robert K. Blair, chief, school division; Capt. Harold Thomp-

To protect kisses

... and steaks

It's SYLVANIA for Cellophane!



... and chocolate cakes!

Assured flavor and freshness! That's the secret of the growing popularity of Sylvania Cellophane. Yes, Sylvania Cellophane is a beautiful wrap, but it is also much more. This versatile packaging material guards against air, dust and moisture ... keeps the product in tip-top condition from processor to consumer!

Don't overlook today's improved Sylvania Cellophane. It offers even better protection and more beauty. We hope that soon even more will be available for every requirement.

SYLVANIA CELLOPHANE

Made only by **SYLVANIA INDUSTRIAL** Corporation

Manufacturers of cellophane and other cellulose products since 1929

General Sales Office: 122 E. 42nd St., New York 17, N.Y. ★ *Plant and Principal Office:* Fredericksburg, Va.

SYLVANIA CELLOPHANE

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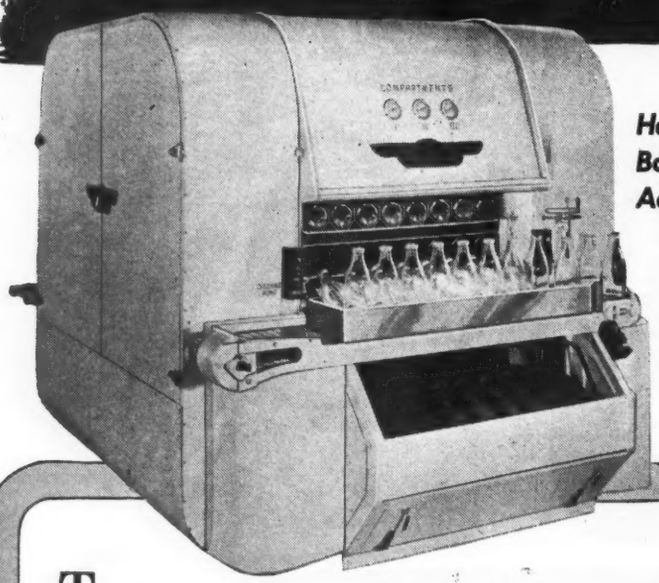
THE
VIKING BOTTLE CLEANER
Offers You SIMPLICITY, EFFICIENCY, ECONOMY



Handles Square Bottles Without Adjustment, Too

The few parts of the Viking bottle cleaner are rugged and long lived, assuring maximum economy of operation with a minimum of maintenance expense. Its design is as simple as Barry-Wehmiller ingenuity, experience and advanced engineering can produce.

A long submerged soaking period, plus high hydro-washing pressure after soaking, makes the Viking a true marvel of efficiency in delivering sparklingly clean bottles. Because of its simple, rugged design, the new square milk bottles can be handled without any mechanical adjustments.

Designed with capacities from 20 to 90 bottles per minute, plus the cleaning action that assures positive bottle sterility, the Viking is an outstanding value in its field.

Write today for details of the Viking to meet your individual requirements

BARRY-WEHMILLER MACHINERY CO.

1946... Our 61st Anniversary • St. Louis, Mo., U.S.A.

MAJOR GEORGE GELMEN

kins, chief, control laboratory division; Dr. Jesse H. White, chief, administrative division, and Albert V. Grundy, chief, container research and development division.

Chemical and bacteriological laboratories, facilities for testing packaging under various conditions, storage chambers of varying climatic conditions throughout the world, and a food acceptance research laboratory occupy 80,000 sq. ft. These laboratories are equipped with the latest in processing machinery and facilities, and are staffed with 200 technically trained and experienced men and women.

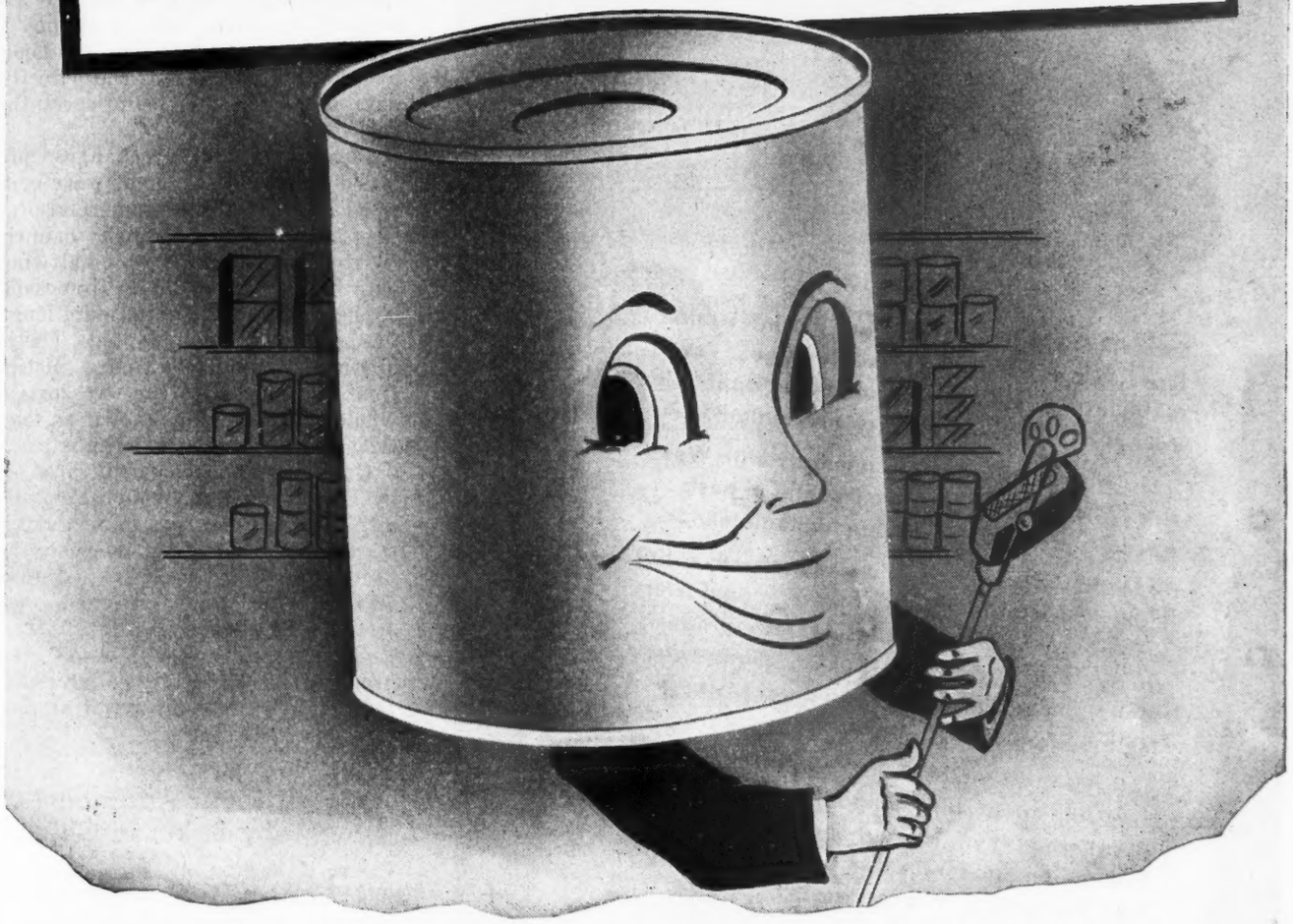
The program of the Food and Container Institute covers almost every aspect of food and container research development, such as processing, chemical, bacteriological, nutrition, organoleptic and physical properties. Under the committee on food research, the Institute is sponsoring over 130 research projects at 83 different research departments throughout the United States. These projects are under the direction of nationally known specialists in their field.

Publications reporting the results of these investigations will be made available by the Institute.

Frozen Food Accounting

A TWO-WEEK cost accounting institute for the frozen food industry was recently concluded by the Food Processors Foundation, at the College of the Pacific. Emphasis was placed on segregation of accounts, record forms and office equipment, office organization, payrolls and timekeeping, as applicable to frozen food operations.

YOUR SYSTEM'S NOT SOUND WITHOUT GOOD LOUD SPEAKERS!



Have you good loud speakers hooked up to your sound system of marketing? Do your packages shout their influence in sales volume? You can be sure they will—designed in the modern manner by ROSSOTTI!

The ROSSOTTI organization knows how to make your package design drown out competition. We have been at it since 1898. To our broad background of experience, we add progressive modern techniques. Not until we have made an exhaustive analysis of your markets, do we create your new label and carton designs. And we are content with nothing less than new packaging that is distinctively different from your competitors'!

We invite your inquiry into our complete service—which features the finest color printing in our own large modern plant. Call in the ROSSOTTI consultant nearest your headquarters—without incurring obligation.

Rossotti

SINCE 1898

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ROSSOTTI WEST COAST LITHOGRAPHING CORP., 5700 Third Street, San Francisco 24, California

INFESTATION NEVER CURED ITSELF,

BUT-WESTVACO METHYL BROMIDE GETS EFFECTIVE KILLS — ALWAYS!

Some ills cure themselves—but not infestation! It progresses from small losses to large . . . even to the loss of customers should traces appear in your products despite every precaution!

So it's good business to fumigate with Westvaco Methyl Bromide at the first hint of pests . . . because it checks infestation immediately!

Methyl Bromide is not only effective but highly adaptable. Among others, manufacturers of canned vegetables, cereal products, candy, paste products, baked goods, dairy foods, spices, soup mixes and drugs insist upon Methyl Bromide in their sanitation programs.

Write for technical data concerning this economical, adaptable fumigant; its scientific application in vault, tarpaulin, box car and plant fumigation and for the names of leading industrial fumigators in your vicinity familiar with its effective use.

One of America's leading suppliers of Methyl Bromide, Westvaco invites plant managers, executives and all interested in pest control to avail themselves of our constructive, on-the-job, technical service without charge or obligation.

Westvaco CHEMICALS

METHYL BROMIDE
FOR EFFECTIVE FUMIGATION

WESTVACO CHLORINE PRODUCTS CORPORATION
405 LEXINGTON AVENUE · NEW YORK 17, N. Y.
CHICAGO, ILL. GREENVILLE, S. C. NEWARK, CALIF.

Canned Bean Hearings Elicit Some Criticism

A WEEK of hearings on standards for canned green and wax beans discloses some important industry criticisms of the changes in the standards of identity and the new quality standards proposed. An excellent attendance from the industry participated for several days, beginning on May 14.

Perhaps the most important industry suggestion was that the new and revised standards not be applied to the 1946 pack in any case. It is hoped by the industry that the effective date will be set so as to meet this request.

Identity standard changes proposed by the Government were critisized in two ways. Commercial practice, long followed by many canners, is to cut beans in one-half inch lengths, which would be impossible if the three-quarter minimum length first proposed were adopted. The industry also requests that a distinction be accorded to the two sorts of whole bean packing known as "vertical pack" and as "asparagus pack."

Quality standards newly proposed by F&DA are not wholly acceptable, either as to tolerances or methods of testing. Particularly criticism has been offered of the proposed tolerance limits for contained seed, string, and fiber.

Normal procedure for filing briefs, preparation of tentative findings of fact, and subsequent rebuttal criticism are anticipated.

Popcorn Flour Adopted By Baker in Chicago

PIPER BAKING CO., Chicago, Ill., is incorporating 25 percent popcorn flour in its bread to make an appetizing, high-protein, flavorful one-pound loaf. In outward appearance, this loaf looks like an ordinary loaf of bread made from all-white flour. When sliced, however, the slice resembles a homemade slice of bread in texture and taste. It is claimed that the bread retains moisture longer than regular bread and does not seem to be any more susceptible to mold.

Very few changes are necessary for the production of this bread. The mixing, fermentation, baking times and temperatures conform closely to standard procedure. Butter flavoring is added to the formula to enrich the flavor. When the bread is toasted it gives off the odor of freshly popped popcorn. This bread is sliced and cellophane-wrapped. A new wrapper with waxed ends and an

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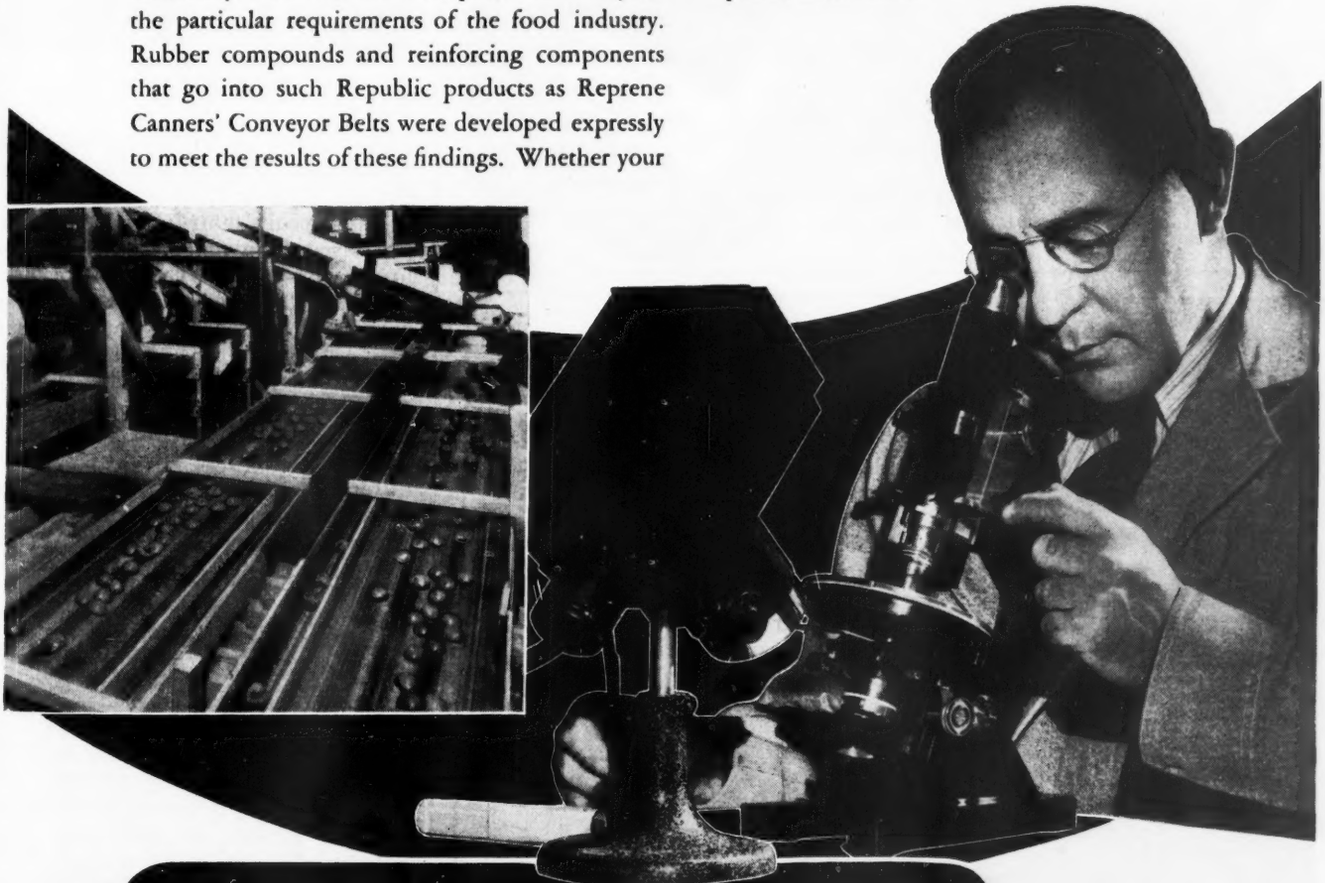

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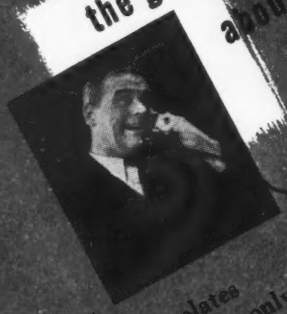

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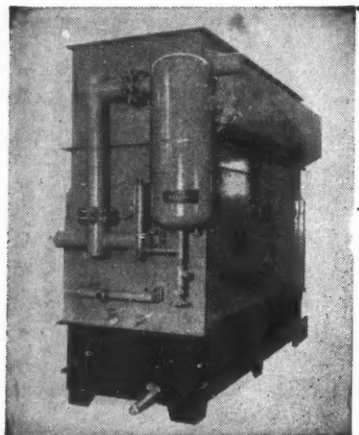

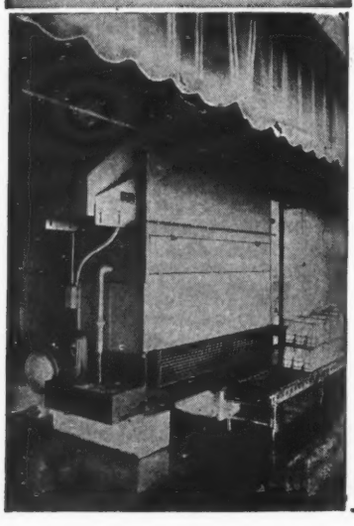

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POPCORN BREAD

open window in the center will soon be adopted. The loaf is sold throughout the greater Chicago area.

The popcorn flour itself is specially processed to avoid a heavy loaf of bread with most of the popcorn flour at the bottom of the loaf. Unless properly processed, the popcorn flour will also weaken the gas retention of the dough.

This flour can also be used in other bakery products, such as rolls. Experiments are now under way with different varieties of popcorn for possible use in cake baking. These varieties give a pure white, more finely ground flour.

Dairy Supply Outlook Is Far From Bright

ALTHOUGH production rates among many of the dairy industrial machinery and supplies manufacturers are up as much as 150 percent over 1941, backlogs of orders to be filled, and shortages of materials and skilled labor make the task of meeting current demand promptly, difficult and often impossible, according to a recent report of the Dairy Industries Supply Association. Deliveries on general dairy and ice cream manufacturing equipment are running about 12 months behind schedule. Manufacturers have encountered unexpected and unavoidable delays, resulting from shortages of materials and components, inability to get delivery from subcontractors, shortage of skilled manpower, and strikes.

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"F.O.B. LOS ANGELES" is the title of an eye opening, fact-packed brochure that has been written and edited for corporation presidents, directors, general managers, vice-presidents, controllers, sales managers, chief engineers and other executives whose opinions are asked for in connection with decisions regarding new plant locations.

Here, in brief, right-to-the-point form, with interesting illustrations, are the key facts you should know about Los Angeles markets, labor conditions, industrial stability, growth, water and power supply and rates, raw materials, basic industries, agriculture, living and working conditions, transportation, harbor facilities, industrial sites.

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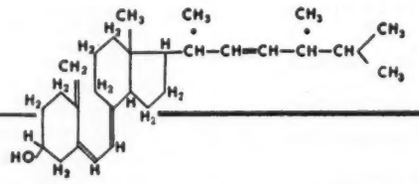

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*Standard Unit=1,000,000 U. S. P. Units

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Corn Meal Standards Hearings Held Again

WHEN the corn meal standards hearings were resumed in late April, for about two and one-half days, there was some opposition testimony to the proposed standards. Conflict between State requirements and the proposed federal standards was cited. Difficulties which would be experienced by the producers in determining that their product met the standards were also mentioned.

Information on assimilation of vitamins and on consumption of the corn meal products was presented for the record. Owing to difficulty in obtaining sieves for granulation tests, however, the Corn Millers Federation requested additional time to prepare further testimony. Accordingly, the hearings were adjourned to June 4. This will, of course, add a month or six weeks to the earliest date by which a proposed order can be issued.

Nutrition Foundation Awards 14 New Grants

FOURTEEN new research grants and renewal of nine previous grants, totaling $176,700, have been announced by the Nutrition Foundation. The new grants are: Harvard University School of Dental Medicine ($15,000), Mount Sinai Hospital, New York ($10,000), University of Cincinnati ($10,000), Children's Fund of Michigan ($30,000), Florida State Department of Health ($2,500), University of Toronto ($15,900), Child Research Council of Denver ($30,000), University of Wisconsin ($2,000), University of California ($3,000), Alabama Polytechnic Institute ($5,200), University of Minnesota ($1,200 for studies of storage of fat and fat-containing foods), California Institute of Technology ($13,500), Duke University ($3,000) and State College of Washington ($5,000).

Shelter Sought For Transient Food Help

FEDERAL AGENCIES are taking steps to shelter up to 50,000 transient harvesting and food processing workers during the coming harvest season. Methods of making available surplus Army tents, cots and cooking equipment, in areas of the greatest need, are being worked out.

Reconversion Director John W. Snyder, in ordering the joint planning effort, warned that a serious loss of food production is threatened unless shelter is found for the mi-

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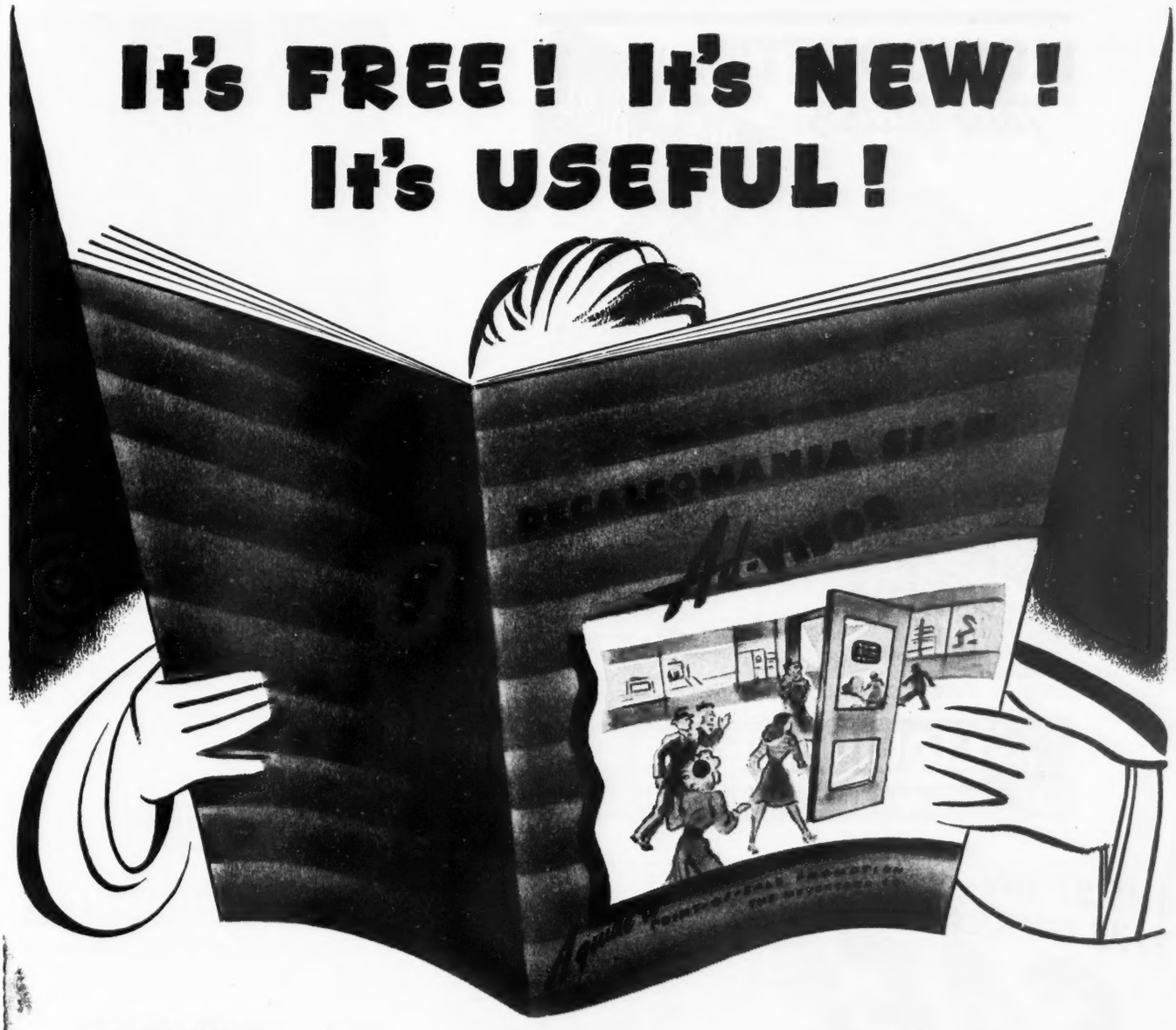

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Unavoidably delayed in production, Meyercord's full color Decal Sign Ad-Visor, according to present schedules, will be available in limited quantities for early Spring distribution. Be sure to reserve your copy now! It's packed with suggestions and ideas for product promotion and dealer identification. See where and how America's leading advertisers use Decal point-of-sale signs. The Ad-Visor suggests dozens of unusual designs and treatments for hundreds of products. Learn how you can cash in on "sidewalk circulation" and "store traffic" sales possibilities with colorful, lasting, low cost Meyercord Decals. Reserve your copy of the Decal Sign Ad-Visor now. All requests will be filled in the order received. Please address Dept. 65-6.

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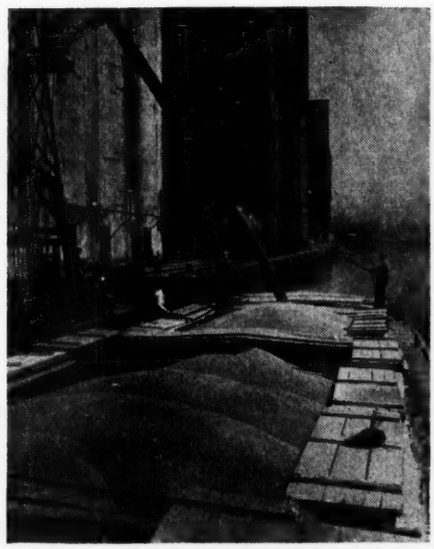

WHEAT FLOW

Every now and then, a view of the brighter side of the food picture turns up. This one shows wheat flowing from one of Buffalo's big elevators into a barge for the short trip to a flour mill. The elevators were at an all-time low in May despite this scene.

gratory workers. Neither new construction nor temporary housing can be counted on to meet the need, he said, because of the building materials shortage.

DISTRIBUTION

New Set-Asides Affect Fish, Meat and Milk

THE Department of Agriculture recently announced new set-aside orders affecting processors of fish, pork and lard, cheddar cheese, and spray and roller process nonfat dry milk solids, and terminated the set aside of hot-packed and frozen cherries processed in 1945.

Canners of all species of salmon—except king, chinook or spring and steelhead, and blueback or sockeye, packed in continental U.S.—are now required to deliver to the government 33 percent of their pack from April 1, 1946, to March 31, 1947. Canners of pilchards, Atlantic sea herring, Atlantic mackerel, and Pacific mackered are required to deliver 45 per cent of their pack during the same period.

Government needs for canned fish of all types included under WFO-44 are expected to be about the same as last year. It is estimated, however, that the 1946 pack wil be about 70,000,000 lb. greater than the 1945 pack and that domestic consumers will get about 480,000,000 lb. as compared with 410,000,000 lb. last year.

The dry milk solids order calls for 60 percent of production during May

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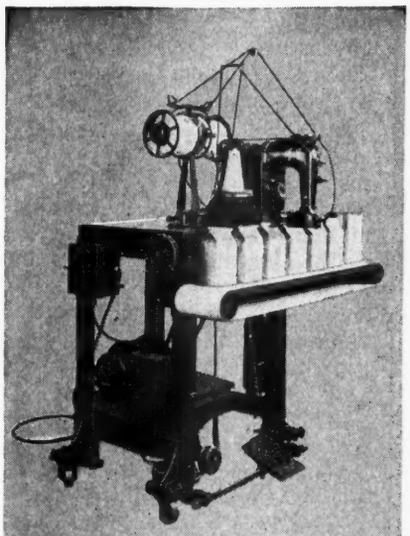

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FAST—Keyed to the output of standard filling of weighing equipment.

ECONOMICAL—Uses inexpensive cotton thread and paper tape.

EASY TO OPERATE — Inexperienced help can be trained to operate the machine in a few hours. Light, easy work.

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VERSATILE — Style 60000 DZ sewing head makes the bound-over tape closure on this range in sizes of filled paper bags.

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dubl-tape closure

on small paper bags

• Where food products are packaged in paper bags —from 1 lb. to 25 lb. size—the closure should be firm, tight, eye-appealing, inexpensive and easy to open. The ideal closure is the Union Special Dubl-Tape Closure. Producing this closure is the final step in mechanized packaging and can best be done with the Union Special 60000 D sewing head. Mounted on the popular Style 21800 N portable, table-type, bag closing machine, this is considered *essential equipment* by many producers of dry foods. Style 21800 N machine includes a power-driven conveyor adjustable vertically to accommodate different sizes of bags. Control is by floor treadle and the unit may be operated from a sitting position. Write for Bulletin No. 100 on packaging.

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Bag Closing Machines

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MARGARINE?

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...do it more profitably with continuous, closed Votator equipment!

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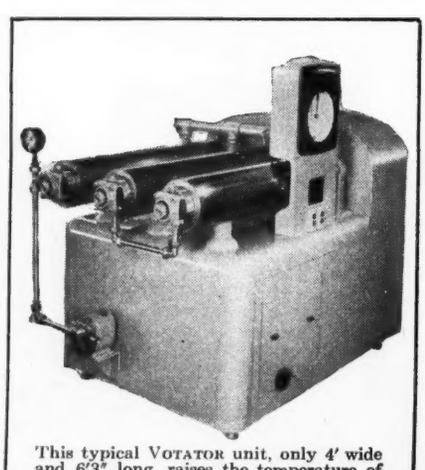

This typical VOTATOR unit, only 4' wide and 6'3" long, raises the temperature of liquid whole eggs from 44°F to 140°F in 15 seconds on a continuous basis to pasteurize 2500 pounds per hour.

VOTATOR—*T. M. Reg. U. S. Pat. Off.*

THE Votator

A GIRDLER PRODUCT

and June to be set aside for sale to government agencies. Last year about 330,000,000 lb. were purchased by government agencies and about 300,000,000 lb. were available for civilian consumption. Tentative estimates for 1946 are that about 400,-300,000,000 lb. were available for civilian consumption.

Cheddar cheese producers must set aside 40 percent of production during May and June. Present indications are that about 120,000,000 lb. will have to be set aside from May through August. During 1945, about 350,000,000 lb. were set aside and 525,000,000 lb. went to civilians. About 600,000,000 lb. are expected to be available for civilians this year. This year's export program will be smaller because of increased production in Denmark and Holland.

The pork and lard order, which exempts 11 southeastern states, requires that set-asides of pork at specified plants be raised from 13 to 15 percent, and lard from 5 to 6 percent of the live weight of hogs. The latter applies to both lard and rendered pork fats and is not expected to affect civilian distribution in this country appreciably. Department officials stated that the new rates would make available for government purchase in meeting foreign needs about 25 percent of current pork production and about 50 percent of present lard and rendered pork fat output under federal inspection.

The termination of the cherry order voids WFO 133, which required set-aside of 100 percent of the 1945 pack. All red sour cherries set aside under the order, and which were not sold or contracted for by a U.S. agency as of April 29, are released from all restrictions.

Air and Rail Freight Coordinate Service

DOOR-TO-DOOR air freight service, at rates approximately 50 percent below present air express charges, was started June 1 by Northwest Airlines and the Railway Express Agency. It is the first coordinated air and rail service in the air freight field, according to Croil Hunter, NWA president. The line crosses the continent through the northern states.

Rates are based on 30.7 cents per ton-mile, covering shipments of 100 lbs. or more. Consignments will be moved by air freight as far as possible, with off-line transportation handled by railroads and trucks. Only a single receipt will be required.

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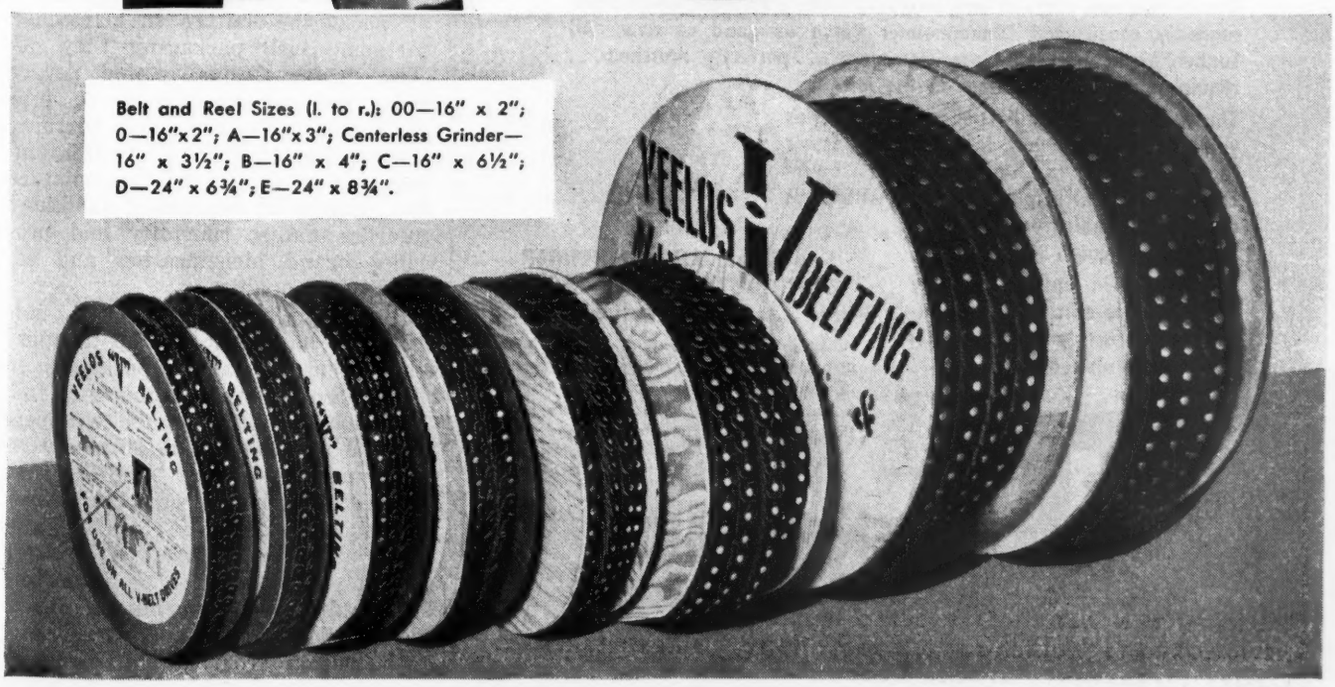

Belt and Reel Sizes (l. to r.): 00—16" x 2"; 0—16"x2"; A—16"x3"; Centerless Grinder—16" x 3½"; B—16" x 4"; C—16" x 6½"; D—24" x 6¾"; E—24" x 8¾".

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AIR FREIGHT

These two New England lobsters, being held so gingerly by an airline stewardess, were part of the first commercial shipment ever sent by air to Chicago. The 2,000-lb. shipment was only eight hours in transit.

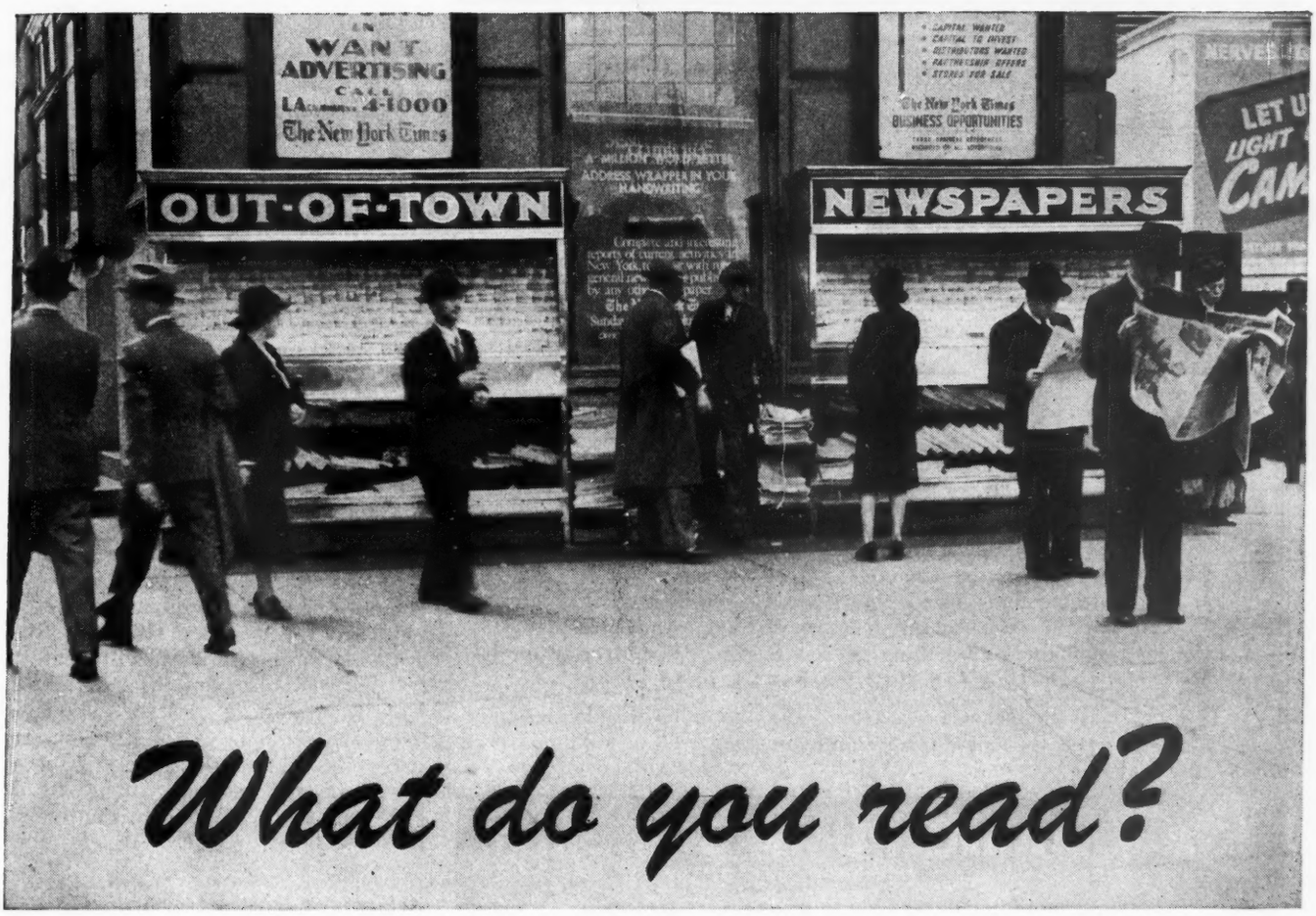
ed out that the new service will supplement but not replace the present nation-wide air express set-up, which is operated over all U. S. scheduled airlines. Packaging will be the same as for air express.

Butter Packaging Is Studied by Council

A POSITIVE approach to the study of butter packaging and merchandising has been made by the Paraffined Carton Research Council, which enters the second year with plans for expansion of its three-year research and merchandising program.

The council lists eight advantages of packaging butter in paraffined cartons. Such packaging they declare preserves quality and flavor; keeps out undesirable odors; protects perishable body and texture; gives better sanitary protection and prevents crushing; reduces moisture loss; makes for convenient handling; guards against rancidity and provides brand identification and assurance of quality.

Research projects at two universities have been set up to study the benefits of paraffin packaging in comparison with parchment, foil, cellophane, pliofilm, waxed wrappers and no wrappers at all. These various materials were studied with respect to (a) maintenance of flavor and score of butter affected by light, time and temperature, (b) prevention of the absorption of off-flavors, (c) reduction of shrinkage as determined by loss in weight and composition from loss of moisture



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Riegel is a striking parallel in the packaging and specialty paper field. It's "What do *you* need?" and the chances are that such a paper can be found in the Riegel Files, which contain more than 600 different grades of paper for packaging, printing, converting and special industrial uses.

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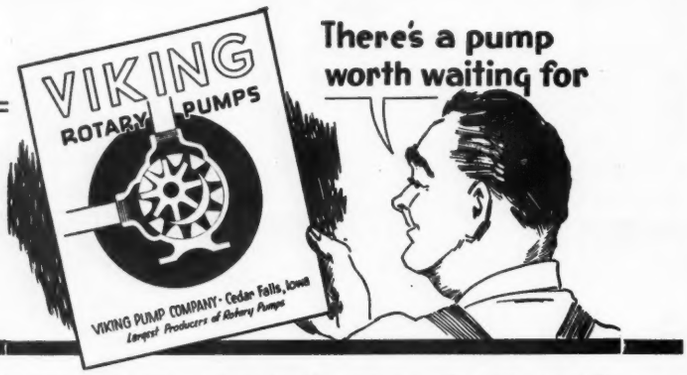
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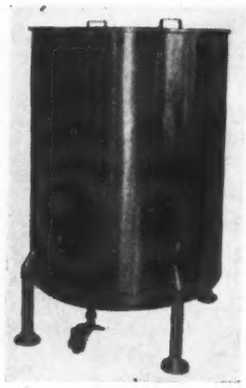

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BATCH CANS

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BATCH CANS: Monel metal or stainless steel. Endless iron ring, handles attached, reinforces top. Bottom reinforced by iron cross welded to iron chime. 10 to 75 gallons.

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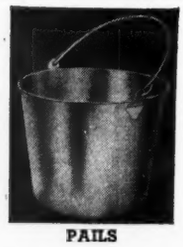

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and (d) protection of the product during handling.

These product analysis studies will be under the direction of Dr. L. C. Thomsen at the University of Wisconsin and Dr. Samuel T. Coulter at the University of Minnesota, Dr. H. A. Ruehe at the University of Illinois being consulted on Council plans.

Paraffined cartons are also used in packaging ice cream, margarine, lard, shortening and frozen foods.

Corn Processors Cut Quotas by 20 Percent

FOLLOWING the government order that all corn processors must reduce grindings by 20 percent on April 1, A. E. Staley Manufacturing Co., of Decatur, Ill., reduced customer quotas by 20 percent. The cuts were made either in the quantity delivered in each shipment or by increase in time interval between shipments.

Commenting on the curtailment, A. E. Staley, Jr., stated, "The shortage of grain is due to the fact that corn has been priced too low in relation to its feeding value, with the result it has been fed to animals in record quantities."

Sauerkraut Producers Plan Promotion Program

A NATIONWIDE public relations program to enhance the prestige and increase the use of sauerkraut is being undertaken by the National Kraut Packers Association.

"The old cliché that sauerkraut is 'the poor man's food and the rich man's medicine' must be eradicated, and the 'social status' of sauerkraut raised," the association's president, Alden C. Smith of Shiocton, Wis., declared in announcing the program. A public relations firm has been hired, he added, to "educate the public to think of sauerkraut as a nutritional and healthful food that can be prepared and served in many appetizing ways, as a dish that will grace any menu."

A committee of N.K.P.A., consisting of Mr. Smith, John Stroup, Lon Flanigan, Art Henkel, Martin Meeter and R. A. Simpson, will have general supervision over the program.

Sugar Head Quits

EARL B. WILSON has resigned as director of the sugar branch, Department of Agriculture, production and Marketing Administration, after more than three years of government service. He will return to private industry.

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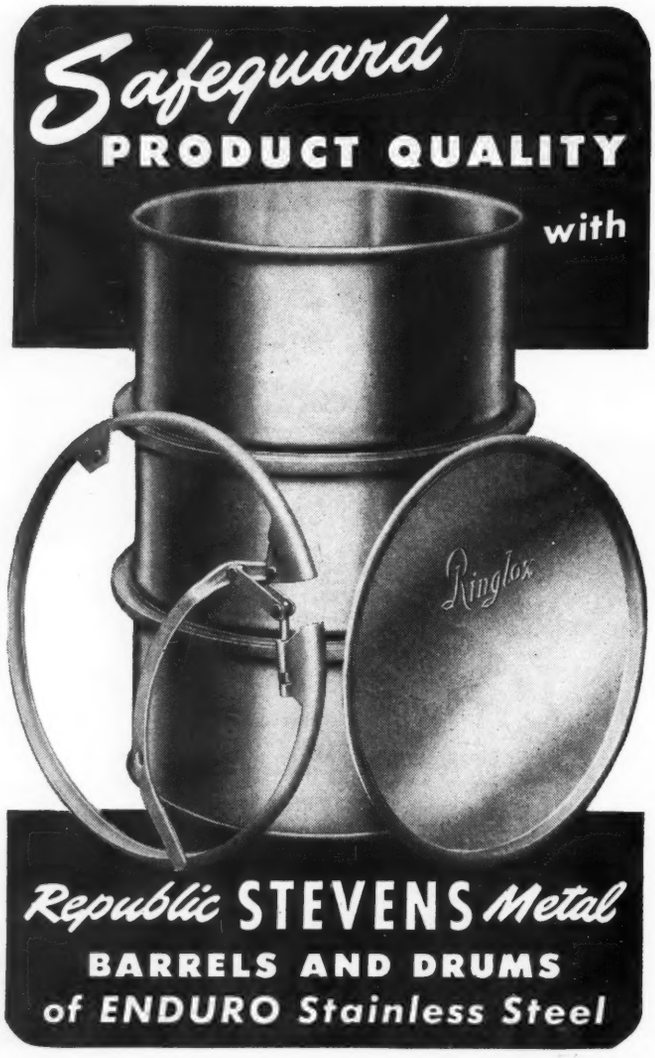
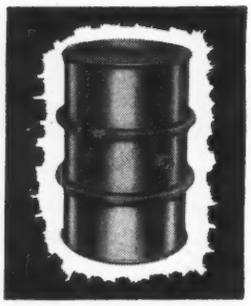


Don't take chances with product contamination. Use barrels and drums of Enduro—the lustrous metal that is inert to most chemical and food products—that is sanitary and easy to clean—that is resistant to corrosion—that is tough and strong—that is economical to use because it lasts so long.



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The solid head drum at the left and the patented Ringlox drum shown above are but two of the many styles in the complete Republic STEVENS Line.*

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METAL BARRELS AND DRUMS

RAW MATERIALS

Cut in Flour Milling Increasingly Serious

THE drastic curtailment of flour mill operations by the first week in June was foreseen by mill operators in mid-May. Predictions then ran as high as an 80 percent shutdown because of the last minute efforts, on the part of the government, to use the first of the early 1946 crop to make up the 40- to 60,000,000-bu. deficit in export commitments to wheat-short Europe.

Although harvesting and threshing had started in Texas and Oklahoma, none of that wheat is likely to find its ways to northern mills. One of the provisions in the USDA's 1946 wheat program stipulates that there shall be no shipments out of New Mexico, Texas, Oklahoma, Arkansas or Louisiana, except for export or by special permit. Under present conditions, little of this early wheat is likely to be available even to southern mills for the making of domestic flour.

Flour production had been curtailed even before April 1, when the 75 percent of production order went into effect. Serious reductions stemmed first from the unprecedentedly high utilization of the 1945 wheat crop both for flour and for feed and then from the adverse effect of the 80 percent extraction order. This order led to an increase in the feeding of wheat to make up for the loss of mill feeds that would have normally resulted from 72 percent extraction.

Bakers, with anywhere from two weeks to a month's supply of flour on hand, will begin to feel the real pinch by late June. This pinch may be lessened if the export drain can be eased by that time, if sufficient wheat is then available, if cars can be had for heavy shipments of wheat to the mills and flour to the bakers, and if the mills can find the manpower for extra heavy production in late June and July. Neither the millers nor the bakers are optimistic.

Concern for Fruit Caused by May Frost

FROST is causing concern over the size of the fruit crop. The warm weather of late March and early April caused fruit "to become two to three weeks ahead of normal in most sections east of the Rocky Mountains," according to the weekly weather and crop bulletin, which reported "peaches blooming nearly to

The FACTS Behind the Glycerine Shortage

AS everybody knows, the war and the widespread disruptions following it have caused a serious world-wide shortage of fats and oils, from which glycerine is derived.

This is the reason why enough glycerine cannot be produced at present to supply immediately all the heavy demands of the reconversion period.

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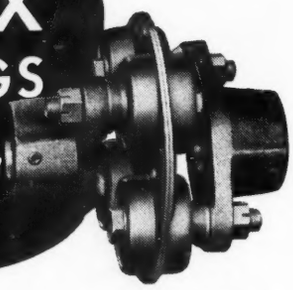

Where cleanliness is essential, Morflex couplings are the answer. Require absolutely no lubrication—no oil or grease to throw off and soil or contaminate products. Specially designed rubber trunnion biscuits absorb shock, isolate vibration, smooth operation. Sizes from 2" to 12" diameter, for various capacities.

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GOLDEN YELLOW CAROTENE...The Vitamin A Nature Supplies in Fruits and Vegetables

ONE MAN JOB
Spraying is a one-man job in this California pear orchard. Steering wheel, clutch and throttle have been extended into the tower, enabling one man to both drive and spray.

the Lake Region and apples coming into bloom in the Ohio Valley," during the last week of March.

The bureau reported freezing temperatures "southward" to northern Missouri and nearly to the Texas Panhandle on May 11th and 12th and to the lower Lake Region and northeast on the 8th, 9th, 12th and 13th. Many weather stations in the North Central border states reported the lowest temperatures ever recorded for so late in the season."

In addition, some local frost damage was reported in early April in Northern and Mountain regions. Frosts were general over the eastern half of the country and the Pacific West during the middle of April, but according to official reports caused only light damage to early fruits, "although considerable damage was reported locally from sections of the Lake Region and Appalachian areas."

Additional damage was reported in the same area the last week in April and first week in May. In spite of cool weather, however, which retarded growth, crops were reported at that time to be still two weeks ahead of normal in most sections east of the Rocky Mountains.

"Although it is too early to appraise the full extent of frost damage," said the mid-May bulletin, "it appears to be moderate to locally considerable, in North Central areas, to truck, fruit, sugar beets, some early spring grain and possibly to wheat. . . . Much apprehension was felt as to the possibility of considerable frost damage to headed wheat in the critical freeze areas of western Kansas."

MOTHERS VOTE 3 to 1 FOR BABY FOOD PACKED IN GLASS!

Mothers voted nearly 3 to 1 for baby food packed in glass in a recent national survey conducted by a noted public opinion analyst.* Customer-preference for glass-packed food is the greatest sales *plus* in the food industry.

Here are the reasons women gave for preferring the modern glass package for this all-important purchase:

SAFETY:

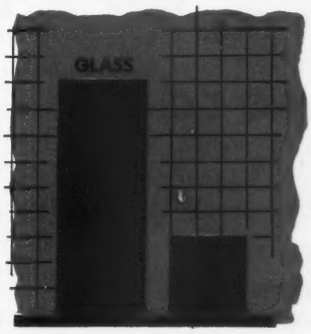
Food is cooked in own sanitary glass container—thus assuring absolute cleanliness and the full nutritional value. Food tastes better. Glass adds no taste of its own.

CONVENIENCE AND ECONOMY:

Busy mothers can heat food, serve it and store left-over portions in glass container. *No wasted food —or time...* double economy! Packages are so easy to open—so easy to reseal.

VISIBILITY:

Mothers trust what they can see. Color, amount and goodness shine through gleaming glass. Glass adds spick-and-span sparkle to shelves... shows when to buy more.



PREFERENCE:

More and more mothers are choosing baby food packed in glass-clean containers. The 3 to 1 preference is increasing! A vote like this makes preference mean demand!

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Wheat Crop Prospects Hold to High Estimate

LATE April and early May rains in the hard winter wheat areas have materially improved the prospects for a near-record winter wheat crop of 800,000,000 bu. for 1946. This estimate, as of May 15, is approximately 8 percent higher than that reported by the Department of Agriculture, as of May 1.

May 15 prospects still do not make a wheat crop, but they are more indicative than the earlier estimates. An excess of rain and cool temperatures, too little rain and excessive temperatures, rust growth, Hessian fly and green bug damage and hot dry winds can yet get in their deteriorating effects. Hail damage is more likely to be local than general.

Field reports, as of May 15, indicate a continuance of favorable soil conditions in both hard and soft winter wheat areas. Growths were generally luxuriant and healthy in most sections of the country. In the southern part of the soft winter wheat area of the Middle West the growth continues slightly too rank for the heavy yields of 1945.

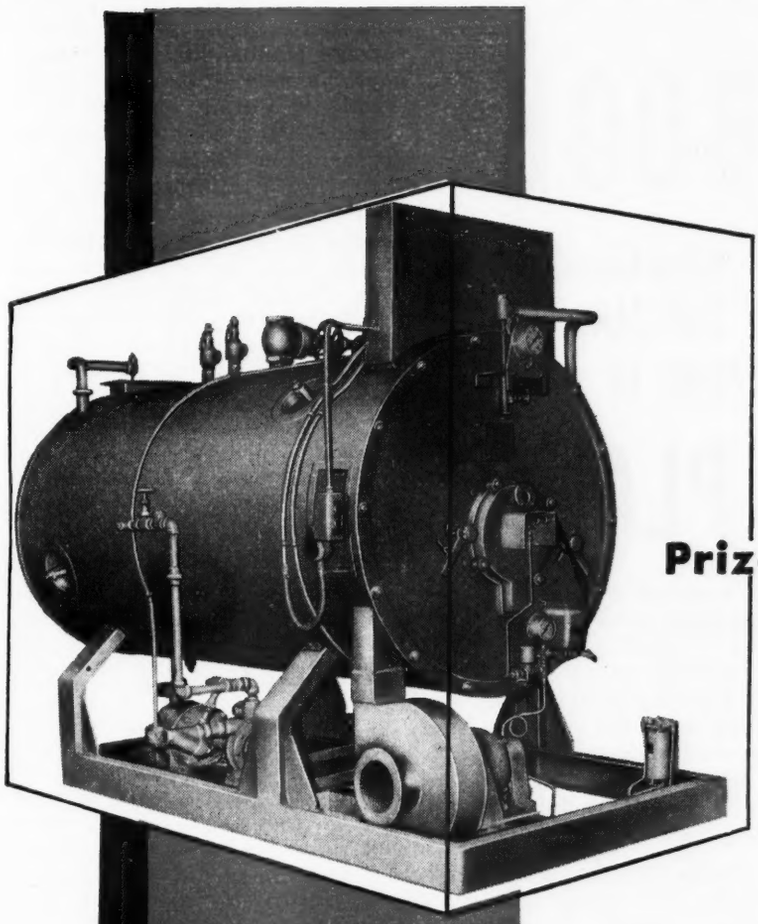
Seeding in the Northwest hard spring wheat area is completed and the fields are becoming promisingly green. Heavy early spring rains delayed some planting in Oregon and Washington, but with no injurious effect upon 1946 crop prospects.

In all areas the subsoil moisture content has been better than average. Earlier deficiency of moisture in western Nebaska, Kansas, and Oklahoma, Panhandle Texas and eastern Colorado has been offset by May rains. Drought and high wind damages in those areas are estimated to be no more than 10 percent. A high percentage of the hard winter wheat is in summer-fallowed fields. Winter kill throughout the hard and soft winter wheat areas is negligible. Continuance of favorable weather conditions and periodic rains during the remainder of the growing and maturing periods will more than offset the effects of winter kill, insect, drought and high wind damage.

Acreage planted throughout the country is reported to be in excess of last year although in some areas there is a decrease. Earlier reports of abandoned acreage have been exaggerated.

In the Nebraska-Kansas Colorado-Oklahoma-Texas hard winter wheat area, seeded acreage is estimated to be about 6½ percent above 1945 and about 18 percent above the 1934-1943 average.

In the Minnesota-Dakotas-Mon-



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YOUR PLANT

The Superintendent responsible for plant sanitation and maintenance cleaning operations in your plant will "pick up" many valuable pointers on handling such jobs as: cleaning, derusting, descaling and related operations. We believe he will find much that is interesting in those sections devoted to the important subject of safeguarding quality control with modern Oakite germicidal materials and methods.

The comprehensive Oakite Digests described below include a wealth of tips, *tested* techniques to help put your sanitation routines on an *easier, faster,* more *effective* basis with Oakite cleaning and germicidal materials.

3 OAKITE GUIDES TO LOW-COST DAILY CLEAN-UP WORK

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QUICK FREEZE & LOCKER PLANTS . . . Expressly prepared for operators of quick freeze, dehydrating and locker plants, this Oakite Sanitation Digest gives many valuable, time-saving tips on daily clean-up of processing and handling equipment. A special section is devoted to germicidal treatment of equipment surfaces.

FREE . . . Whichever Will Help You . . . WRITE TODAY!

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tana hard spring wheat area the acreage planted has been increased approximately 5 percent. Acreage planted to Durum wheat in the Dakotas is estimated to be increased by approximately 25 percent.

In the Washington-Oregon-Idaho winter and spring wheat area the planted acreage is estimated to be increased by as much as 5 percent over that for 1945. Some acreage which has been lying idle during recent years is planted to wheat this year. This reported increase is in contradiction to the Department of Agriculture estimate of a decrease of about 5 percent. The differentiation between winter and spring crops in these states is largely a matter of soil conditions. If planting conditions are favorable, the planting is done in the fall; otherwise in the spring.

One Strike Settled

A BRIEF STRIKE that threatened to block the opening of the Alaskan salmon canning season was settled last month when the Alaska Canned Salmon Industry, Inc., and the Cannery Workers Union agreed on a new contract, which included a substantial increase in the seasonal guarantee to resident fishermen.

Halibut Allocation

A HALIBUT allocation plan for the new season, similar to the one in effect last year, has been announced by the Department of the Interior, after consultation with the industry. This year the Fish and Wildlife Service Seattle Office will administer the plan, which is designed to assure orderly marketing by fishermen within the maximum price regulations.

SCHEDULE OF EVENTS

JUNE

1-30—National Dairy Month.
2- 4—Flavoring Extract Manufacturers Association of the U. S., annual convention, Drake Hotel, Chicago.
2- 5—American Society of Refrigeration Engineers, spring meeting, St. Paul Hotel, St. Paul, Minn.
3- 7—National Fire Protection Association, 50th annual meeting, Hotel Statler, Boston.
9-12—Bakers' Association of the Carolinas, annual convention, Ocean-Forest Hotel, Myrtle Beach, S. C.
17-18—Mayonnaise and Salad Dressing Manufacturers Association, annual convention, Palmer House, Chicago.
17-19—Grocery Manufacturers of America, mid-year meeting, Shawnee Inn, Shawnee-on-the-Delaware, Pa.
20—National Pickle Packers Association, mid-year meeting, Bismarck Hotel, Chicago.
24-26—Chemical Institute of Canada, annual conference, Royal York Hotel, Toronto, Canada.
24-27—National Confectioners' Association, 63rd annual convention and 20th Confectionery Industries Exposition, Stevens Hotel, Chicago.

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It will pay you to investigate A.C.M. Clay Coated Cartons for your products. While tremendous demand for these famous cartons has production taxed to the utmost now, plant facilities are being expanded as rapidly as possible to meet future requirements.

CHECK THESE A.C.M. SUPERIORITIES

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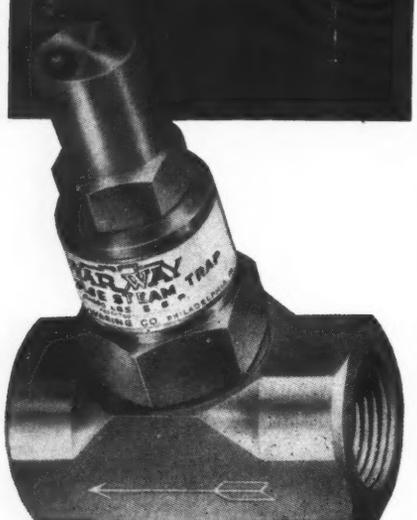

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STEAM TRAP

Changes in Food Supplies
(Indicators)

Production

Flour production continued its decline from the previous month, in April, when 13,682,413 sacks were reported by the Northwestern Miller, representing 73 percent of the total output. This was a drop of 852,781 from the total of 14,535,194 sacks, produced in March, and a decline of 1,632,831 sacks from the April, 1945 output. During April, ten durum manufacturing companies made 595,945 sacks of durum products, compared with 785,788 sacks during March, and 863,497 sacks in April, 1945.

Creamery butter production, in March, was estimated at 76,675,000 lb., lowest for the month since 1921. Output was 30 percent lower than March, 1945, and 44 percent below the five-year average (1940-1944) for the month. The seasonal increase from February was 16 percent, compared with 17 percent gain last year, and a 14 percent average increase for the previous five years.

Milk production on farms, in March, was estimated at 9,800,000,000 lb., 2 percent less than in March, 1945, but the second highest on record for the month. Abnormally mild weather, east of the Rockies, during March, made pasture prospects highly favorable on April 1, in all areas except the West.

American cheese production, for March, estimated at 53,540,000 lb., was 19 percent lower than March, 1945, and 5 percent less than the five-year average for the month, since 1941. Output increased only 22 percent from February, compared with a 27 percent seasonal gain between the same months last year, and a 24 percent average gain in the years 1940 to 1944.

World potato production, for 1945-46, is estimated at 6,459,000,000 bu., 11 percent smaller than the 7,298,000,000 bu. harvested in 1944-45. The 1935-39 average was 8,127,000,000 bu. The decline is attributed largely to smaller harvested acreage, although the yield per acre was also below average.

Dry Casein production at 750,000 lb., in March, was 26 percent less than a year ago, and 75 percent below the 1940-44 average. The seasonal gain in production from February to March, this year, was slightly less than last year, but considerably greater than the average seasonal increase during 1940-1944.

Poultry canned, or used in canning, during March, totaled 11,145,000 lb., compared with 18,746,000 lb., in March, 1945, 13,261,000 lb. in 1944 and 10,951,000 in March, 1943. The March pack consisted of 10,630,000 lb. of chicken and 515,000 lb. of turkey.

Tomato catchup production, in 1945-46, was slightly smaller than the previous year, totaling 11,484,022 actual cases, compared with 11,688,265 actual cases for the 1944-45 pack.

Canned pumpkin and squash, produced in 1945, was only 62 percent of the 1944 pack, according to the National Canners Association. The 1945 pack totaled 1,849,000 cases, No. 2 basis, while the previous year's pack came to 2,977,000 cases, No. 2's.

The canned sweet potato pack, for 1945, was far the largest on record, the National Canners Association reports, totaling 3,074,000 cases, basis No. 2's, which compares with the 1944 pack of 1,680,000 cases, No. 2's.

Canned spinach production was slightly smaller, in 1945, coming to 8,637,000 cases, No. 2 basis, compared with the 1944 pack of 9,957,000 cases, according to the National Canners Association. The pack of turnip greens, mustard greens and other greens, however, was larger in 1945, totaling 2,619,965 actual cases compared with the 1944 output of 1,233,777 actual cases.

Canned carrots, packed in 1945, showed a 30 percent increase over 1944, in the estimates of the National Canners Association. Production came to 4,312,043 actual cases as against 3,155,184 actual cases in 1944. The 1935-39 average was 948,000 cases, No. 2 basis, while the 1940-44 average came to 2,258,000 cases compared with 4,048,000 cases, No. 2's in 1945.

Canned beet production went up 16 percent, in 1945, setting a new high. Actual cases in the National Canners Association estimate, came to 9,590,539, topping 1944, the previous record high, by 1,553,925 actual cases. In this case the 1935-39 average, basis No. 2's was 2,722,000 cases, the 1940-44 average rose to 6,348,000 and the 1945 pack came to 9,149,000 No. 2 cases.

Evaporated milk production totaled 234,000,000 lb., in March, a decline of 29 percent from the corresponding month last year, and a decrease of 8 percent from the 1940-44 March average. Production for the first three months of the year were about 28 percent below the corresponding 1945 period.

Canned sweetened condensed milk production, in March, was 9,965,000

lb., a decline of 11 percent from a year earlier, but a gain of 23 percent from the 1940-44 March average. January through March output was 26,965,000 lb., 8 percent less than in the same 1945 period.

In Storage

Frozen fish and shellfish holdings, on May 1, were 75,738,742 lb., which compares with 32,508,618 lb. held May 1, 1945 and 84,265,345 lb., on April 1, this year. The average for the date is 40,468,000 lb.

Wheat in storage in all positions, on April 1, totaled 338,644,000 bu., about 60 percent of the 562,974,000 bu. held on the same date in 1945, and the lowest for the date since 1938. They are larger, however, than April stocks in 1935, 1936, 1937 and 1938. The lowest point reached in these years was 211,000,000 bu., April 1, 1937.

Frozen fruit in cold storage on April 1, reached 320,175,000 lb., as compared with 344,026,000 lb., March 1, and 193,786,000 lb., April 1, 1945.

Frozen vegetable stocks were 146,623,000 lb., on April 1, as against 156,274,000 lb., March 1, and 99,976,000 lb., April 1, 1945.

Industrial Income

Percentage return on net incomes after taxes for all manufacturing industries, in 1945, was 9.1 percent. A breakdown of the food field shows baking, 10.0; dairy products, 11.7; meat packing, 5.4; sugar, 7.2; other food products, 11.0; soft drinks, 19.6; and brewing, 13.5.

Indexes

Business Week's index on business activity was 162.2 for the week ending May 11, which compares with 166.7 a month ago and 227.9 a year ago.

Wholesale price index on foods, compiled by the New York Journal of Commerce, stood at 114.8, for the week ending May 17, as compared with 114.4 a week earlier, and 108.5 for May, 1945.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded May (thousands)	Total Awarded 1946 (thousands)
Bakery	$ 205	$	$ 2,775
Beverages	2,897	1,166	17,700
Canning and Preserving	600	760	5,213
Cold Storage	325	510	5,533
Confectionery	155	1,360	1,715
Grain Mill Products	665	443	5,046
Ice, Manufactured	...	...	905
Meats and Meat Products	1,465	214	1,169
Milk Products	1,830	265	5,582
Miscellaneous	1,121	1,055	10,364
	$9,263	$5,773	$56,002

- Cadmium Plated For Protection Against Corrosion and For Better Appearance
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Save their cost over and over again!

TOPMOST PROTECTION
Far greater safeguard to clothing than ordinary aprons!

AMAZING STRENGTH
Plus lightness in weight for utmost wearing comfort.

6 COLORS — 4 SIZES
PRICES — SIZES — COLORS

WHITE—Light Weight
27 x 36..$ 6.88 per doz.
30 x 36.. 7.65 per doz.
36 x 40.. 9.35 per doz.
36 x 44.. 10.18 per doz.
Full Length Sleeves $7.15 per doz. pair

BLACK—Light Weight
30 x 36.. 9.78 per doz.
30 x 36.. 9.75 per doz.
36 x 40.. 11.90 per doz.
36 x 44.. 12.60 per doz.
Full Length Sleeves $9.66 per doz. pair
Leggings, Hip Length $11.90 per dozen pair

GRAY—Medium Weight
27 x 36..$ 8.40 per doz.
30 x 36.. 9.78 per doz.
36 x 40.. 11.90 per doz.
36 x 44.. 12.60 per doz.
Full Length Sleeves $9.66 per doz. pairs
Leggings, Hip Length $11.90 per doz. pair

MAROON—Heavy Double Coated Neoprene
27 x 36..$10.61 per doz.
30 x 36.. 12.60 per doz.
36 x 40.. 16.50 per doz.
36 x 44.. 18.74 per doz.
Full Length Sleeves $12.90 per doz. pair
Leggings, Hip Length $23.50 per doz. pair

BLACK—Heavy Double Coated Neoprene
27 x 36..$10.61 per doz.
30 x 36.. 12.60 per doz.
36 x 40.. 16.50 per doz.
27 x 36..$ 8.40 per doz.
Full Length Sleeves $12.90 per doz. pair
Leggings, Hip Length $23.50 per doz. pair

WHITE—Extra Heavy 20 Mill Plastic
27 x 36..$12.90 per doz.
30 x 36.. 14.00 per doz.
36 x 40.. 18.33 per doz.
36 x 45.. 20.50 per doz.
Full Length Sleeves $12.90 per doz. pair
Leggings, Hip Length $23.50 per doz. pair

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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

ANY TAX CUT?—Some Washington forecasters during midspring were glibly prophesying a further cut in personal income taxes before election. Such a Santa Claus vote was not expected generally even then. And no one in the late spring has any such thought since John Lewis effectively set back postwar readjustment and thus destroyed taxable income to so great an extent both in industry and for individuals. Uncle Sam is going to need all that he can collect from restricted incomes.

TARIFF CUT EXPECTED—With the British loan problem out of the way (whether one likes the Senate action or not) there is now a clear road for State Department negotiation of new trade and tariff arrangements. Sound interpreters of Washington generally seem to agree that the United States is going to cut many more tariff rates soon. Thus, Uncle Sam will reduce the difficulty of foreign countries in sending goods to the United States. The hope of the advocates of this policy is for increased trade from which foreign governments can begin to pay some of their past debts and prepare to pay for needed new goods.

FREIGHT TO RISE—The cost of rail movement of foods and other industrial materials is bound to increase before very long. Washington does not expect that I.C.C. will grant the 25 percent increase asked by the railway systems. Neither do the rail officials. But costs have gone up enough that some significant rate of increase undoubtedly will have to be granted. Thus, there is a sure prospect of higher food costs for some indeterminate date of the not distant future.

PIG PLANS—One food regulation, changing normal business relationships, promptly makes more regulations necessary. This fact was never better illustrated than the action in mid-May by Secretary of Agriculture Anderson asking that farmers make a 10 percent cut in pig production next fall. That cut is intended to reduce the number of grain consumers by reducing the pig population of the country. A secondary effect, which is admitted, will be a further reduction in supplies of pork and lard in the latter half of 1947. All of the early forecasts that world famine conditions would concern American consumers only until 1946 crops had been garnered are now obviously discredited forecasts. And what happens to the pig population is still anybody's guess.

LONG-TERM PLANS—Again Chester Davis and his associates have demonstrated a realistic habit of thought. They are confessing in Washington that the present short-term program of food supply for the famine areas is only a small part of the necessary food program of the United States. The present grain policies have already gone so far that milk supply in 1947 to 1948 will undoubtedly suffer. It is proving very difficult apparently, for Mr. Davis to get official study of such long-term problems as this. Still prevalent in the Department of Agriculture is the philosophy that prices of agricultural goods must be controlled so that farmers' income will be maintained. The thinking is on prices and farm income, not on supply of goods despite the war experience that these old fiscal philosophies are inadequate for planning, when used alone.

NOT CONSUMPTION—Washington has glibly stated that the United States consumption of food per capita is currently 30 percent greater than in the late thirties. Actually that is not a correct statement. They are talking about disappearance and not direct food consumption. The distortion probably comes largely from high purchase per capita of meat and other processed product that represent per pound a much greater disappearance of food and feed raw materials. For example, it takes 10 lb. of grain to produce 1 lb. of meat as food. It seems likely that the actual poundage of food and calories of food really eaten are not significantly greater now than ten years ago.

CHANGE OF ADDRESS

DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
330 WEST 42nd STREET, NEW YORK 18, N. Y.

Please change the address of my Food Industries subscription.

Name .....

Old Address .....

New Address .....

New Company Connection .....

New Title or Position .....

WAGE DEALS NOT VALID—An employer may not legally compromise with his workers regarding settlement of claims for back wages or damages claimed because of under-payments, as compared with Wage-Hour law rules. One firm, which had made such a settlement, with the willing agreement of its workers, has been told by the U. S. Supreme Court that such compromise of controversy "thwarts the public policy of minimum wages, promptly paid, embodied in the Wage-Hour Act." That employer is now penalized because he came to an agreement that was accepted willingly by his workers. This seems again to prove that the employer has no legal rights under the law except to pay and pay, and then to go to court and be told to pay more.

PLENTY OF SPICES—Government restrictions on cinnamon sales were eliminated in May. Thus, nearly all kinds of spices are now to be had through commercial channels, if one can find what he wants in quality. Restrictions remain only on pepper and nutmeg, which have remained for the longest period, subject to distribution control.

ESTIMATES VARY—Washington has often heard that there is a deficit in grain supply for famine areas amounting to 14,000,000 tons of wheat or its equivalent. Some estimates even state the need as high as 20,000,000 tons. The final report of Mr. Hoover's world survey is given as a deficit of 3,600,000 tons. The large disparities in estimates are making it much more difficult to persuade the American people to cooperate, official Washington admits. Commonly heard about the Capital is the idea, "We'd gladly save more food if we thought starving people would ever get the benefit."

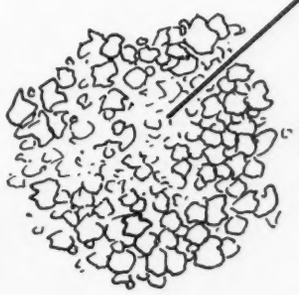
MORE BEET SUGAR—Chemical science has contributed in a novel way to sugar beet production. Washington, therefore, expects a steady increase of sugar beet and beet sugar production from now on; and it hopes that the costs will be lower than ever for the sugar. A special coating permits planting of segmented seed in a manner like corn planting. Mechanical planting, mechanical cultivation, and even mechanical harvesting and washing for the sugar mill are possible.

NEAR-RECORD PLANTINGS—Agricultural Department estimates show "another near-record acreage of crops" this year. The urge to feed the world's hungry is proving almost as great a stimulus for agriculture as did wartime necessity.

FOOD BOARD LIVES ON—Combined Food Board, which represents British, Canadian and United States interests, continues an important factor in food planning of Washington. This agency would probably have died before now if the world feeding job had not developed such great urgency.

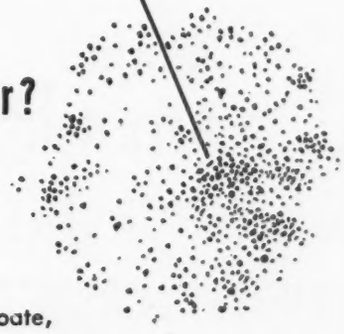
Monsanto Sodium Benzoate
U. S. P.

do you prefer



flakes

or powder?



There are two forms of Monsanto Sodium Benzoate, U.S.P. — flake and powder. Many food processors and bottlers prefer the flake form because it flows more freely and evenly than powder, does not lump or ball, creates less dust, and is therefore less objectionable to operators. Because of these advantages, it is easier to handle and blend for consistently uniform results.

Whether you choose flake or powder, depends on your own preference. In either case, samples of both are available, together with technical information and data. Contact the nearest Monsanto Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Cincinnati, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

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VODOL is absolutely neutral as to *Odor* and *Taste* in end use

This is the unanimous finding in hundreds of comparative proof tests. As an outstanding characteristic, it establishes VODOL as a prime essential for products of the most exacting standards.

Instantly soluble at low temperatures. VODOL does not require pre-heating, pre-dissolving, straining nor thinning.

VODOL pours freely. Is easily handled. Disperses in liquid, solid, or semi-solid fats. When used in margarine, VODOL does not darken under normal frying temperatures.

VODOL IS AVAILABLE FOR IMMEDIATE SHIPMENT IN DRUMS OF 500 LBS., 50 LBS., AND 25 LBS. ★★★ SMALLER PACKAGES BY ARRANGEMENT.

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FROM REPORT OF A LEADING LABORATORY

Straight dough bread made up to contain 4% shortening with **VODOL** added to replace 1.5% of shortening.

Addition of **VODOL** gave softer loaf when fresh, and softer loaf **42 HOURS AFTER** baking. Softness as revealed by test is expressed in Millimeters and represents compressibility of a slice under load in 10 seconds. The softer the bread, the greater the compressibility. Results:

Test for Freshness

Oven No.	1	2	3	Av.
Fresh: No VODOL	93	90	89	91
FRESH: VODOL	109	104	93	102
42-hr. old bread: No VODOL	26	26	33	28
42-hr. old bread: VODOL	42	47	48	45

MEN • JOBS • COMPANIES

INDUSTRY

American Home Foods Corp. made their second major acquisition of the year, in the recent purchase of the Joseph Burnett Co., Boston, manufacturers of liquid flavoring and food coloring products. Other food producers under American Home's banner are Chef Boy-Ar-Dee, Clapp's Baby Food, G. Washington Coffee, Duff's Mixes and Anhydrous Foods.

Churngold Corp., Cincinnati, has purchased the Roxanna Canning Co., Lebanon, O., involving two modern canning plants at Waynesville and Roxanna, O. The two plants will continue to pack sweet corn, and other products will be added as conditions permit.

General Mills, Inc., has approved construction of a new cereal plant for packaged foods at Lodi, Calif., and a modern flour mill and elevator at Los Angeles. Both plants will be part of the Sperry division of the company under Edward O. Boyer, San Francisco.

Gonzales Products Co., recently organized in Gonzales, La., is building a sirup mill, canning plant and an ice factory on the outskirts of the town.

Hallmark Seafood Cannery recently started operations in a new plant in Eureka, Calif. The plant has a daily capacity of 300 cases of crab meat, which is being packed under the Wave King label. It is managed by Ray Walker.

Hunt Foods, Inc., is planning the purchase of Guggenheim and Co., producers of dried fruits in California. The price is said to be around $1,500,000. Hunt officials say they will enlarge operation of this new division to a volume of from $8- to $9,000,000.

Orleans Country Canning Co., Barre Center, N. Y., lost a warehouse, factory and office in a recent fire. Hundreds of cases of canned foods were destroyed in the blaze. The loss is estimated at $400,000.

Shedd-Bartush Foods, Inc., Detroit, recently acquired the B. S. Pearsall Butter Co., and has been operating it as a branch plant. J. J. Vandertoll is general manager.

Southeastern Frozen Packers Assn. recently held an organization meeting at Macon, Ga., and named Cliff H. Bateman, Macon, chairman. W. H. McKenzie, Montezuma, was named secretary and treasurer of the association, which is at present made up of 60 frozen peach packers.

Spencer Packing Co., which now operates plants at Sunnside, Wash. and Lebanon, Ore., is completing a year-round plant at Portland, Ore. Operation is expected to start June 15, and will include the packing of peaches, pears, plums, berries, cherries, tomatoes, pumpkin and other vegetables, jams and preserves.

Tennessee-Kentucky Canners Assn. recently elected Shell R. Clevenger, Bush Bros. and Co., as president for the coming year. Other officers are J. Paul Craddock, Bardwell Canning Co., Bardwell, Ky., vice-president and C. Hays Hollar, Hollar Canning Co., Newbern, Tenn., secretary-treasurer.

University of California, staff members, at Berkeley, recently received certificates of appreciation for food research from the U. S. Army. The recipients include: Samuel Lepkovsky (Army rations), W. V. Cruess (dehydration and K-rations), E. M. Mrak (Army food research for one year).

RAYMOND S. PERRY

The board of directors of the Maxson Food Systems, Inc., New York, have elected Raymond S. Perry president. The new president comes from Olin Industries, Inc., East Alton, Ill., where he was in charge of all research and of the development of new products. William L. Maxson, until now acting president, moves up to chairman of the board.

J. J. LE CLARE

Key posts in the Diamond Crystal and Colonial Sale units of General Foods go to J. J. LeClare, who has been elected president of the sales companies of both units, as well as general manager of Diamond's operations at St. Claire, Mich., and of the Colonial company at Akron, O. Mr. LeClare joined the Diamond company in 1911.

M. H. BRIGHTMAN

The Dairy Industry committee has announced the appointment of M. H. Brightman as executive secretary. Mr. Brightman has been serving as assistant director of the dairy branch, Production and Marketing Administration, and assumed his new duties June 1.

C. F. EVERS

The National Association of Frozen Food Packers has appointed C. F. Evers as technical director. An authority on frozen food standards for grades, Mr. Evers, until recently, was director of research for Birds Eye-Snyder division of General Foods.

Adventures of "Crimpy"
THE BUFFALO WIRE CLOTH MAN
Let me tell you why so many folks prefer me GALVANIZED AFTER WOVEN. Not just for rust, mind you. But for many other uses. Maybe you'll get an idea!
They call me "smoothy." I'm so bright and smooth. Just the right coating. My joints are sealed closed. Makes me screen faster. Not only that, I'm unusually strong. Rigid mesh, you know.
Folks like to cut me into small pieces. They say I'm easy to work with – so flat and true. Don't unravel like other cloths. Don't buckle or lose my squareness.
You'll profit from knowing more about "Buffalo" Galvanized After Woven Wire Cloth. FOLDER 597 explains how "Buffalo's" scientific method of weaving and galvanizing saves production costs. FREE ON REQUEST.
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Manufacturer of All Kinds of Wire Cloth Since 1869
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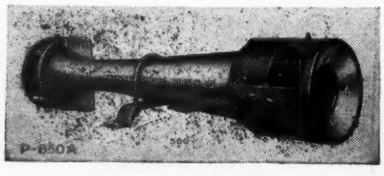
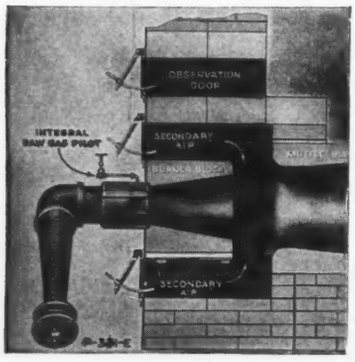
FOR FIRING FURNACES ... AND PROCESSING EQUIPMENT

NATIONAL AIROIL BURNERS
for FUEL OIL
... for GAS





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The "Airocool" gas burner gives efficient results throughout the operating range.

Tandem Block Combustion Units control flame position accurately and positively with resulting economy of fuel. Combustion is efficient with a minimum of excess air and the shortest possible flame. These units can be equipped with combination oil and "Airocool" gas burners, and will perform equally well with either fuel. Quick change made from one fuel to the other without alteration to equipment.

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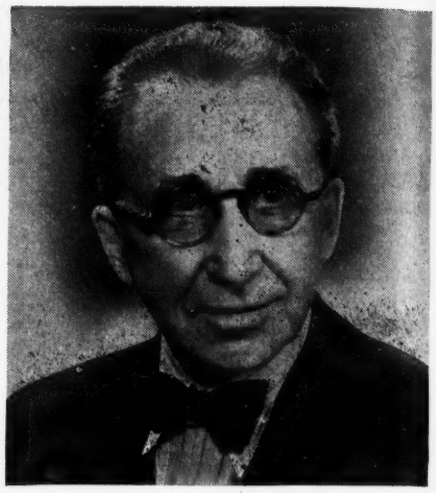


JAY E. FITZGERALD
After serving as assistant secretary and director of information of the National Canners Association since 1924, Jay E. Fitzgerald retired, May 1. He has been in contact with canners since 1916, when he joined the bureau of foreign and domestic commerce.

PERSONNEL

Herbert E. Apple, Jr., has been named manager of the Birdseye-Snider division of General Foods Corp., with headquarters in Rochester, N. Y. He succeeds Harold J. Humphrey, who has been transferred to New York.

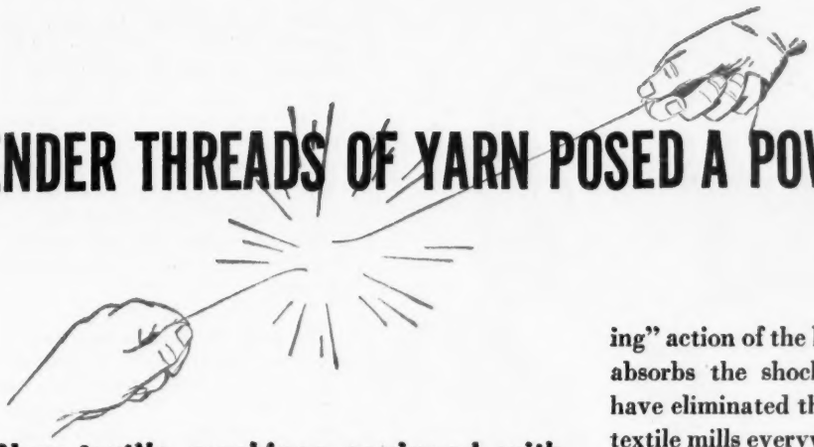
Walter Byrd has been appointed packaging engineer of Standard Brands, Inc. He will study, inspect and analyze new developments in materials, machinery and methods pertaining to packaging, and will initiate projects leading to better packaging.

C. M. Chester, who since November, 1943 has been chairman of the executive committee, was elected honorary chairman of General Foods Corporation at the recent regular meeting of the company's board of directors. Mr. Chester will continue his active directorship in the corporation.

C. H. Chitham, Milford Canning Co., Milford, Ill., was recently elected president of the Corn Canners' service bureau. Other newly elected officers include: J. LeRoy Farmer, J. LeRoy Canning Co., Cedar Rapids, Ia., first vice-president; F. S. Silver, Silver Canning Co., Colora, Md., second vice-president; J. P. Kraemer, Mammouth Springs Canning Co., Sussex, Wis., secretary, and Harvey R. Burr, Chicago, Ill., executive secretary-treasurer.

L. P. Douglas, L. P. Douglas Co., New York, was elected president of the American Bulk Condensed Milk Association, Chicago. Other officers elected were A. B. Holin, Momence Cooperative Milk Association, Momence, Ill., vice-president; O. A. Kielsmeir, Watseka Dairy Products, Watseka, Ill., treasurer, and Bert Anderson, Bennett Creamery Co., Ottawa, Kan., secretary.

SLENDER THREADS OF YARN POSED A POWER DRIVE PROBLEM



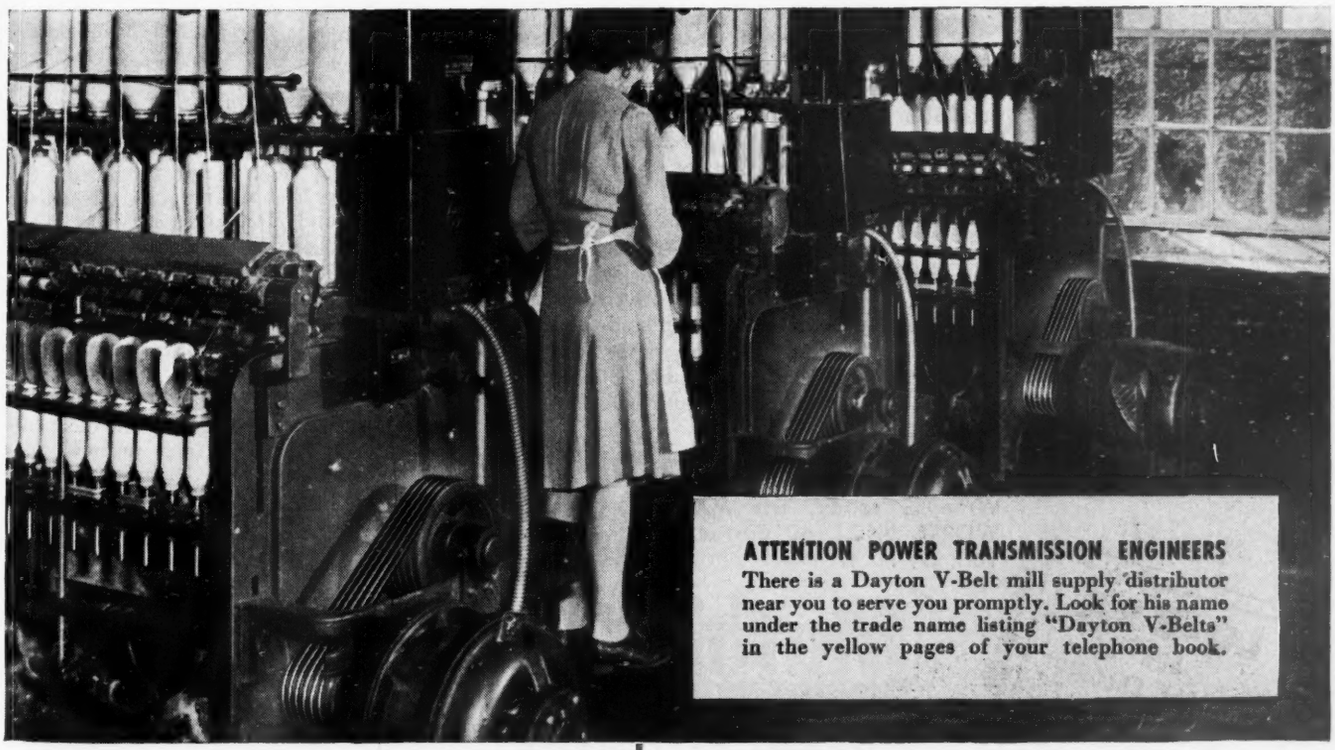
Now textile machines equipped with

Dayton V-Belt Drives

START SMOOTHLY...RUN SMOOTHLY

and tiny strands of yarn no longer break

Abrupt, jerky starts of other types of power drives on textile machines caused the yarn to break frequently, often necessitated machine shut-downs with resulting production losses. Now the *engineered* resilience of Dayton V-Belts, and the "seating" action of the belts in the pulley grooves which absorbs the shocks of suddenly applied power, have eliminated these production losses in leading textile mills everywhere. In many other industries, too, Dayton V-Belt Drives have increased machine efficiencies because they transmit power *smoothly* and *positively*, making precise power control possible. These advantages have been *engineered* into Dayton V-Belts as the result of 40 years of research and experience working with natural and synthetic rubbers, perfecting *specialized* rubber products for specific industrial jobs. Let Dayton V-Belts solve your power transmission problems. Write for full information to The Dayton Rubber Manufacturing Company, Dayton 1, Ohio.



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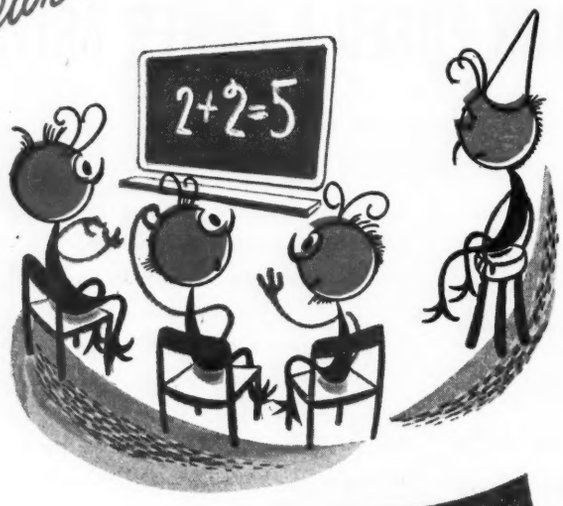
Bacteria can't do Arithmetic—



but how they can MULTIPLY!

In rapidly increasing millions, dangerous bacteria attack product quality *unless* all surfaces and equipment, wherever food or beverages are handled, are kept scrupulously clean and sanitized.

Lo-Bax, the concentrated, fast-killing chlorine bactericide, helps prevent food spoilage and improves quality standards by rigidly controlling bacteria and sanitizing all surfaces with which food or beverages come in contact.

Simple and easy to handle—winter or summer—Lo-Bax kills bacteria almost instantly on contact . . . and at amazingly low cost. It dissolves quickly in water—hot or cold, hard or soft—to make clear chlorine rinse solutions. Lo-Bax, with its 50% available chlorine, is dependable—retains its strength as packed in original container.

Let us tell you how Lo-Bax can help you maintain high quality standards the year round. Write us today. THE MATHIESON ALKALI WORKS (INC.), 60 East 42nd Street, New York 17, N. Y.

LO-BAX
50%
AVAILABLE CHLORINE
LO-BAX SPECIAL
—a superior chlorine bactericide in granular form—packed in 2½-lb. bottles, ½ doz. to the case; and in 14-oz. bottles, 1 doz. to the case.
LO-BAX POWDER
—a highly efficient chlorine bactericide packed in 1¾-lb. bottles, 1 doz. to the case.

Mathieson
LO-BAX
CHLORINE BACTERICIDE
50% AVAILABLE CHLORINE

Lo-Bax . . . Super-Nufos . . . HTH-15 . . . Dry Ice . . . Carbonic Gas . . . Ammonia, Anhydrous & Aqua . . . Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda . . . Liquid Chlorine . . . Chlorine Dioxide . . . PH-Plus . . . Synthetic Salt Cake . . . Sodium Chlorite Products . . . Sodium Methylate

Col. Robert W. Hughes has been elected executive secretary of the Independent Livestock Marketing Association of Ohio. His headquarters will be in Columbus. Colonel Hughes has just been released from the army after 5½ years of service, during which time he gained a reputation for being one of the largest food buyers in the armed services. He saw service in both the Pacific and the European theaters of war.

Herbert A. Kaufmann has been appointed director of development and research of the American Molasses Co., New York. He was formerly with the American Maize-Products Co., New York, as manager of sales research and industrial service.

Russell L. Pfeiffer, former manager of Carnation Co.'s milk-evaporating station at Chico, Calif., has been named manager of the company's model dairy farm near Seattle, Wash.

Jack Rathbone, formerly sales manager for the Kansas Milling Co., Wichita, Kan., together with several other Kansas Milling Co. employees, has purchased the stock of the Arnold Milling Co., Sterling, Kan. Mr. Rathbone is president of the reorganized company.

Howard F. Simmons, secretary-manager of the Michigan Milk Producers Association, Detroit, has been elected president of the Michigan Allied Dairy Association, a federation of seven dairy organizations. Two other dairy organizations in the state recently elected new officers. Ted Baumann, Remus, Mich. was elected president of the Michigan Association of Creamery Owners and Managers, and Gar Wagner, Flint, Mich., is the new president of the Michigan Milk Dealers Association.

DEATHS

Dr. A. W. Bitting, 75, food consultant and pioneer food technologist, recipient of 1945 Nicholas Appert award, April 21, in Lafayette, Ind.

Dr. Henry Vail Dunham, 70, vice-president of the Casein Company of America and a director of the American Plastics Corporation, until his retirement in 1941, May 12, in Bainbridge, N. Y.

Samuel Harbison, 39, part owner of the Superior Packing Co., Broderick, Calif., April 18, as a result of an automobile accident in Rock Springs, Wyo.

Dr. A. C. Hunter, 53, chief of the division of microbiology, Food and Drug Administration, after 28 years service with the USDA, April 13, at Hillendale, Md.

Joseph H. Julicher, chief chemist, Pillsbury Flour Mills, Buffalo, March 3.

"These chops look good! Let's have some tonight."

Those colorfully-wrapped chops have certainly stimulated Father's appetite—and buying urge. He reacts quickly to the attractive design processed by Dobeckmun on transparent film packages and overwraps. Better still, he'll buy again because he appreciates how flavor, tenderness and quality are so faithfully safeguarded in Dobeckmun packages.

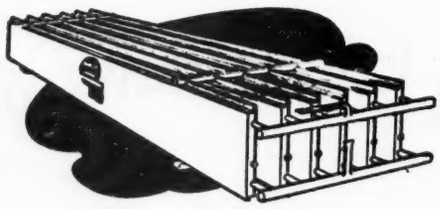
The Dobeckmun Company, Cleveland 1, Ohio. Branches at: Boston, Chicago, Cincinnati, Los Angeles, New York, Philadelphia, San Francisco and Seattle. Representatives everywhere.

DOBECKMUN

Self-selling packages in processed films and foils

DOLE

Vacuum Plate



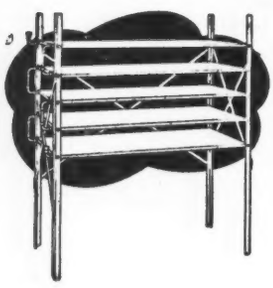
Dole Locker and Storage Plates Available in different sizes.

REFRIGERATING UNITS

for

- QUICK FREEZING
- PRESERVING
- TRANSPORTING

FOOD



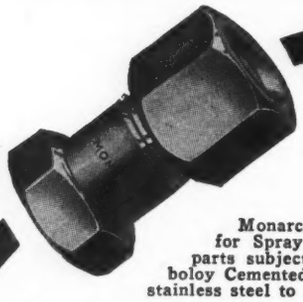
Quick Freeze Plate Unit Available in different sizes.

Dole plates are used and recommended by outstanding Refrigeration equipment manufacturers. Used by the Government for Cold Storage Rooms in the U. S. A. and Foreign Bases.

Write for Catalogs, Engineering assistance or a representative to call — no obligation

DOLE REFRIGERATING COMPANY
5910 N. Pulaski Rd., Chicago 30, Illinois
N. Y. Branch: 55 W. 42nd St., New York 18, N. Y.

SPRAY DRYING?

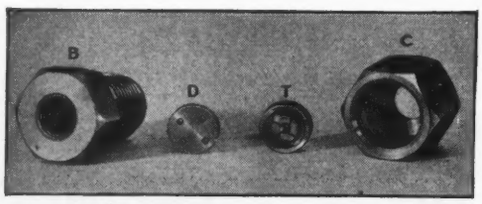


Do your present nozzles last as long as you think they should? Do they produce a fine, uniform powder over a relatively long period? Will they resist corrosion as well as erosion?

Monarch H-466 nozzles are specially designed for Spray Drying work, and, for long life, the parts subject to wear or erosion are made of Carboloy Cemented Carbide. Other parts are made of 18-8 stainless steel to resist corrosion.

Plants powdering milk, eggs, coffee, molasses, etc., report nozzle life of 50 to 100 times that of nozzles of ordinary materials. Think of the savings resulting from the elimination of "down" time alone!

Write for Catalog 6-A



MONARCH MFG. WORKS, INC.

3307 Salmon St. Philadelphia 34, Pa.

William C. Moller, for 26 years treasurer of Curtiss Candy Co., Chicago, April 22, in Chicago.

James Patterson, 52, manager of production control for the California Vineyards Association, May 6, in Fresno, Calif.

Warner T. Robling, 48, general production manager, The Borden Co., New York, April 29, at Greenwich, Conn.

Charles E. Sommer, 51, director of production, National Dairy Council, Chicago, recently.

ASSOCIATED INDUSTRIES

Bird Machine Co., South Walpole, Mass., recently elected F. K. Becker to the presidency of the company. Mr. Becker succeeds Phillips Dennett, who retired April 1, after 35 years with the company, the past 20 years as its president. He has been associated with the company since 1916 and has been vice-president in charge of sales since 1926.

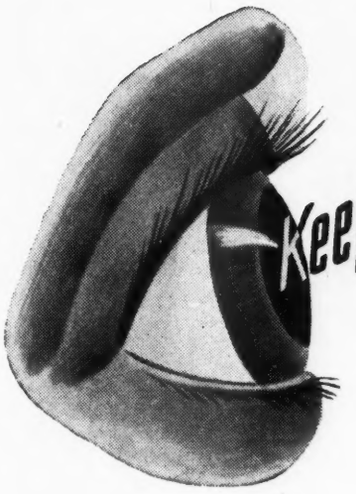
Dobeckmun Co., Cleveland, is making plans to spend $500,000 for expansion to their present plant at Cleveland and for the erection of a new plant at Berkeley, Calif.

The Mathieson Alkali Works has opened a new dry ice service center and started construction of a new warehouse in Long Island City, New York. A fleet of specially insulated dry ice cars will bring dry ice to the new warehouse from the plant at Saltville, Va. This marks the first time the company has distributed its carbon dioxide north of the Mason-Dixon line.

Pack-Rite Machines, Milwaukee, is no longer distributing the Doughboy rotary sealer. The company is now manufacturing two new rotary heat sealers of its own. The U. S. Navy recently awarded Pack-Rite the Certificate of Achievement for its services during the war.

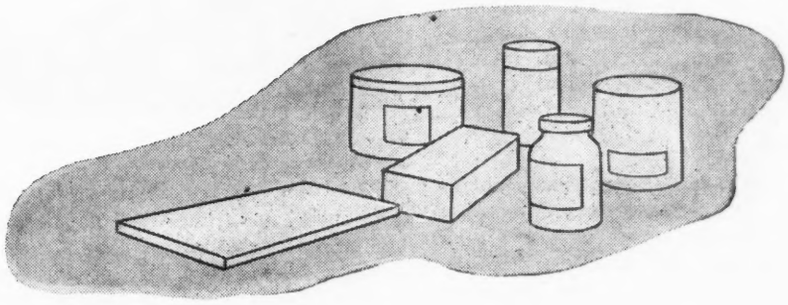
The Taylor Instrument Companies have appointed N. B. Nichols as director of their research division. He succeeds Dr. H. L. Mason, who resigned to accept the professorship of mechanical engineering at Iowa State College. Mr. Nichols has for the past four years been associated with the radiation laboratory of the Massachusetts Institute of Technology, Cambridge, Mass.

Watson-Standard Co., Pittsburgh, has appointed Joseph M. Perrone as director of research. For the past three years Mr. Perrone has been doing research and development work on protective coatings at Mellon Institute of industrial research.



Keep your eye on NOPCO

FOR CONTINUING IMPROVEMENT IN YOUR SUPPLY OF VITAMIN A AND VITAMIN D



Make no mistake—NOPCO Vitamin A and D Concentrates will set the standard for your purchase specifications in the postwar era.

Here are two reasons why:

1. Since 1940, four NOPCO "development" laboratories have been responsible for more than seventy patents or patent applications on *Vitamin A and Vitamin D Concentrates alone.*

2. Five NOPCO vitamin control laboratories conduct routinely *some sixty different control operations,* your assurance of quality control.

This constant striving for technical improvement, and this care in maintaining those improvements in the finished product, are two big reasons why you should *Keep your eye on NOPCO*—for the latest developments in production of top-quality Vitamin A and Vitamin D.

NATIONAL OIL PRODUCTS COMPANY

Chicago • HARRISON, N.J. • Boston
Cedartown, Ga. Richmond, Calif.

Vitamin A and D Concentrates

Pioneer producer of *natural* Vitamin A and Vitamin D Concentrates, Vitab Rice Bran Concentrate and Calcium Pantothenate.

NOPCO

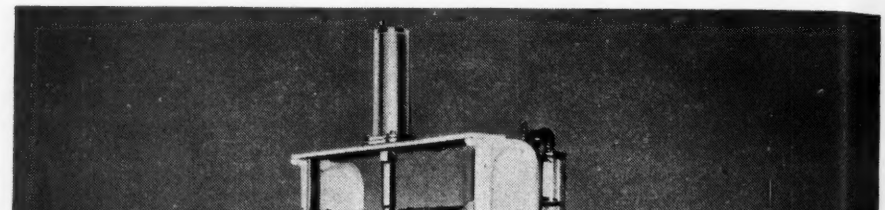
Copyright 1946 National Oil Products Co.

FOOD EQUIPMENT NEWS

Vacuum Bottle Filler

ERTEL ENGINEERING CORP., Dept. I, 300 Front St., Kingston, N. Y., announces a vacuum bottle filler. It will accommodate bottles and jugs, ranging in height from 3 in. to 13 in. The unit is semi-automatic and has an average filling speed, measured in quarts, of 50 per minute. Newly designed valve-type spouts are said to prevent drippage while in operation. Liquid filling height can be accurately and simply regulated and is said not to vary until reset. All liquid contact parts are available in either bronze plated or stainless steel. Vacuum pumps are automatically lubricated and are inclosed in an easily accessible cabinet along with vacuum selector valves and motors.

Pilot lights indicate operative position of vacuum circuits. Liquid is supplied to reservoir of filler by gravity where a constant level is maintained by float valve control.



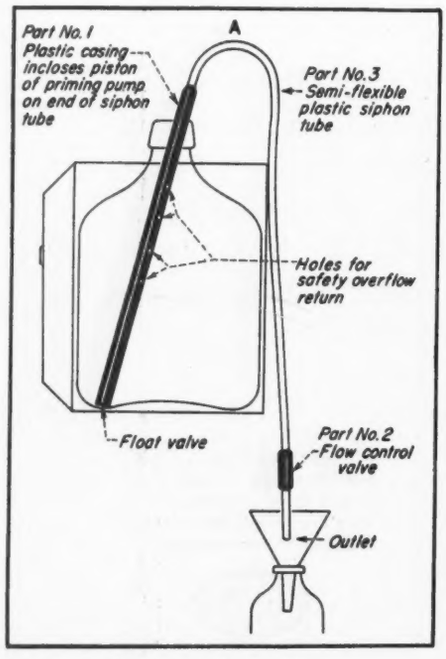
Vacuum bottle filler.

Siphon

ALDEN SPEARE'S SONS CO., Dept. I, 156 Sixth St., Cambridge, Mass., announce an improved safety siphon made of an inert plastic. It is designed primarily for the siphoning of acids from carboys or from the side bung of drums.

The siphon is said to be easily and quickly primed by a built-in pump. Thereafter no further action is required. The entire contents of the carboy may be discharged by the siphon by manipulation of the flow control valve which may be adjusted from a trickle to a fast. steady flow.

The plastic is said to be practically unaffected by all grades of commercial acid, or by alcohol or water.



Improved safety siphon.

Calcium Hypochlorite

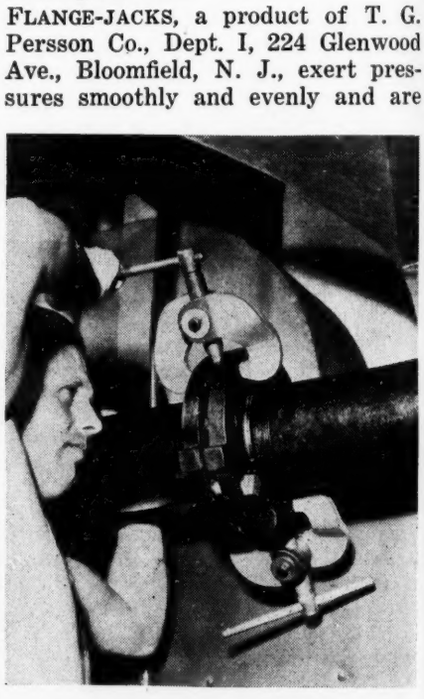
CONTAINING a minimum of 70 percent available chlorine is a high test calcium hypochlorite announced by the Columbia Chemical Division of the Pittsburgh Plate Glass Co., Dept. I, 632 Duquesne Way, Pittsburgh, Pa. This product, previously requisitioned by the armed forces in very large quantities as a bleach, germicide, and disinfectant, is now available for civilian users. Among important uses of the solution on equipment, the company is recommending the treatment of coolers, bottle fillers, pasteurizers, churns, separators, tanks and tank cars.

Infra-Red Units

THE MISKELLA INFRA-RED CO., Dept. I, East 73rd St. and Grand Ave., Cleveland 4, Ohio, announces insulated infra-red ovens with lamped or unlamped units or a combination of both. Units may be had with the lamp set so that the heat rays strike the work diagonally or at 90 deg. F. as desired.

Flange-Jacks

FLANGE-JACKS, a product of T. G. Persson Co., Dept. I, 224 Glenwood Ave., Bloomfield, N. J., exert pressures smoothly and evenly and are capable of opening joints against a load of 15 tons. Bolt holes are said to be maintained in continuous alignment and no damage is caused to flanges. The heavy jaws consist of one-piece steel forgings. Standard size flange-jacks open all 2-in. to 20-in. flanges.

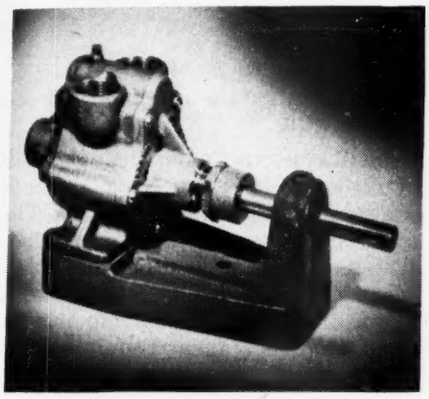


Heavy-duty flange-jacks

Gearless Pump

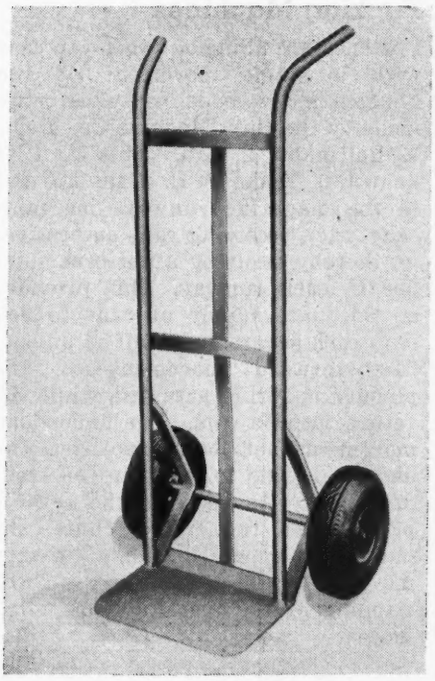
A DOUBLE-IMPELLER gearless pump, with standard 1-in. connections and a built-in external driveshaft bearing and base, has been developed for the circulation of water and other liquids, by ECO Engineering Co., Dept. 41, 12 New York Ave., Newark, N. J. It was designed to eliminate the more common causes of pump failure, namely, gear jamming and stripping. The unit employs double impellers made of several layers of a pressure-vulcanized, laminated material, and can pump equally well in either direction.

The impellers are said to pass sand, grit, filings or sludge material without stalling, jamming, or stripping and without damage to the bronze pump body. It can be mounted at any angle and is available for belt drive or with a coupling for a direct motor drive.



Double impeller gearless pump.

Capacity varies from 7.5 gallons per minute at 600 rpm. to 23 gallons per minute at 1,800 rpm.



Solid nose hand truck.

Hand Truck

THE Rapids-Standard Co., Inc., Dept. I, Grand Rapids, Mich., has added to its line a solid nose hand truck which is said to facilitate the handling of cases, kegs and bags. It is a one-piece arc welded unit that is able to move 500-lb. load. General pneumatic wheels have been adopted for use in this truck, reducing floor maintenance costs and danger of sparks. The tire is a two-ply General with a recommended capacity on each wheel of 250 lb. with a 35 psi. air pressure in the tires. Lower air pressure may be used to give greater shock absorbing qualities to the wheel if the load is lighter.

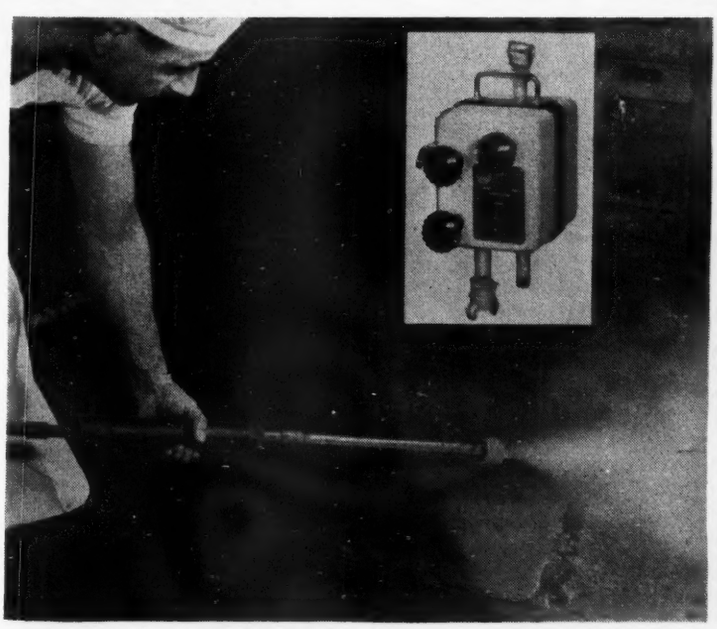
Steam Cleaning Unit

POWERFUL cleaning action exerted by heat, water, detergent and friction is produced by steam cleaning units announced by Turco Products, Inc., Dept. I, 6135 S. Central Ave., Los Angeles 1, Calif. This portable unit, weighing 28 lb., can be coupled to any steam line maintaining from 80- to 150-lb. pressure with a ¾-in. valve outlet. The unit has three manual controls varying the temperature, quantity of solution and nozzle pressure. It can be adjusted so as to deliver a high temperature penetrating spray or a moderately warm spray. A wide variety of specialized cleaning compounds can be used through this unit to clean anything from delicate surfaces to heavy construction equipment.

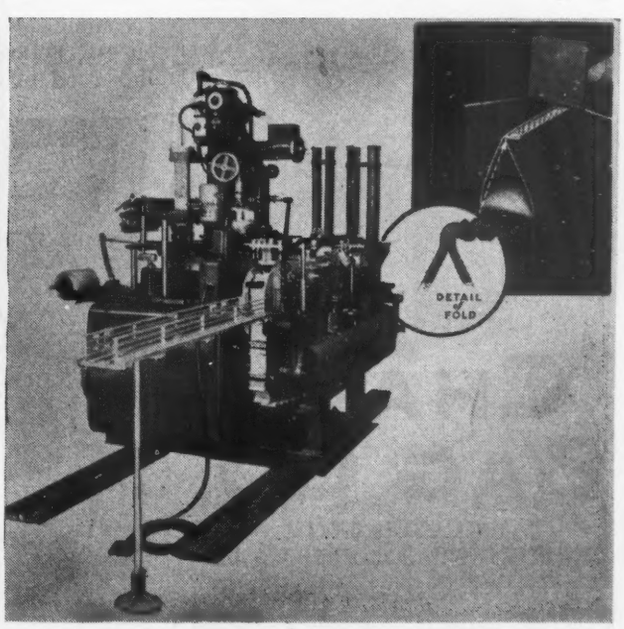
Packaging Machine

AN improved satchel bag packaging machine has been developed by The Fred Goat Co., Inc., Dept. I, 314 Dean St., Brooklyn 17, N. Y. The latest feature is a newly developed hopper that will accommodate both non-free-flowing and free-flowing powders. It makes the bag from a continuous roll of paper, loads it by means of a volumetric measuring device accurately to 1/32 of an ounce, closes it with a sift-proof closure, inserts the bag into a carton (with a circular if desired), seals the carton and delivers the complete package at a rate of 45 per minute. One person can supervise the entire operation.

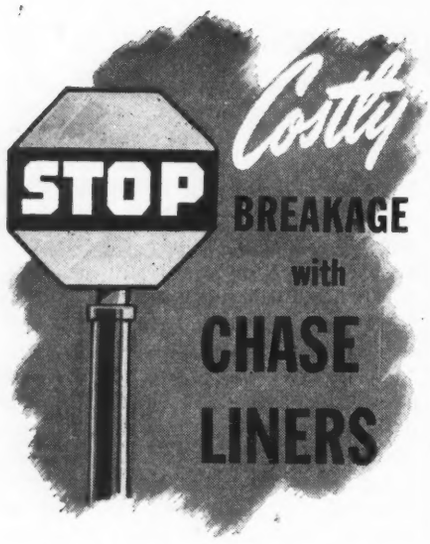
The bag is closed by means of a unique crimp and double fold, making a strong, 100 percent sift-proof combination package.



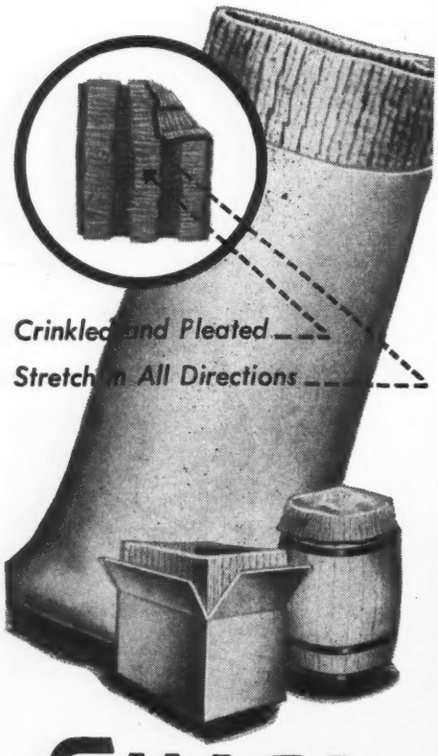
Portable hydro-steam cleaning unit.



Satchel bag packaging machine.



Chase Liners are crinkled and pleated. They're flexible, elastic — stretch in all directions. Provide greater protection, stop costly liner breakage. Check on Chase Liners today — it's the better product that costs no more than ordinary liners.



CHASE BAG CO.

GENERAL SALES OFFICES
309 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MINNEAPOLIS
ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE • PITTSBURGH
BUFFALO • KANSAS CITY • MEMPHIS • GOSHEN, IND. • PHILADELPHIA
NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY • OKLAHOMA
CITY • PORTLAND, ORE. • REIDSVILLE, N. C. • HARLINGEN, TEXAS
CHAGRIN FALLS, O. • HUTCHINSON, KAN. • WINTER HAVEN, FLA.

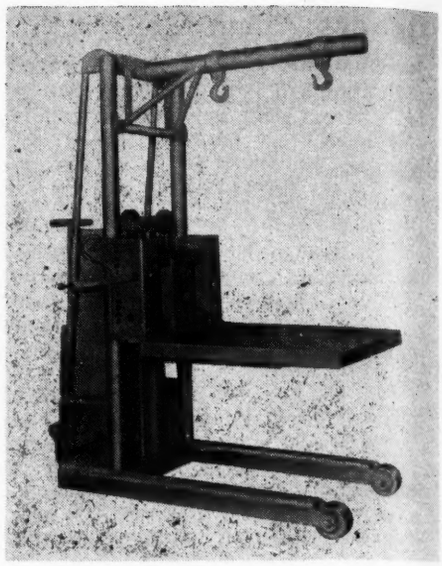
Packing Machines

COMPLETELY filling a two layer case with a single movement of the plunger, a new model packer is being made by the Burt Machine Co., Dept. I, Baltimore 2, Md. This unit is known as Model PCD. Cans are fed to the magazine runways mechanically, each receiving cans successively, thereby assuring a uniform number in each runway. This provides an adequate supply of cans to roll onto each separating shelf in unison. The forward movement of the plunger is spring actuated, while the return is by a cam. The under-load movement not being positive, no damage is said to result in the event of a jam. As soon as the case is placed over the funnel chute, the plunger is released for its forward movement, the customary clutch tripping by the operator being eliminated.

Heat Sealer

HEAT SEAL-IT CO., Dept. I, 4316 Lancaster Ave., Philadelphia, Pa., announce a foot pedal operated heat sealing iron known as "Wrap-Seal It" model. This machine can be mounted on a table and is operated with a foot pedal, freeing both hands for wrapping the package. It is constructed of aluminum, and has two built-in sealing surfaces, one 3x1 in. and the other 2x2 in. Automatic thermostatic control is instantly adjustable to any heat sealing wrapping material. It operates with piston action leverage and a double spring action which provides fast operation.

It is said to be efficient on cellophane, wax paper and all other heat-sealing papers. It is especially recommended in the packaging of cheese, delicatessen meats and similar food products.



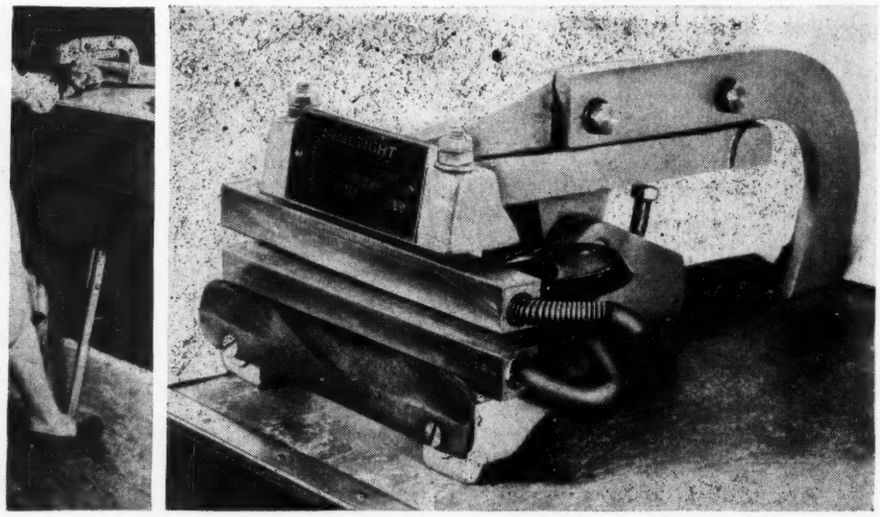
High lift truck.

Lift Truck

LYON-RAYMOND CORP., Dept. I, 2579 Madison St., Greene, N. Y., offer a one ton hydraulic high lift truck. The truck has a removable boom with adjustable hooks and a movable platform. Trucks may be obtained with motor driven hydraulic pump or with hand pump as standard equipment.

Unscrambler

FAST, gentle unscrambling of glass containers is said to be accomplished by unscrambler manufactured by Hartford-Empire Co., Dept. I, Hartford 1, Conn. This unit is said to completely eliminate jamming, even of the final two jars entering the line. It delivers over 300 2⅛-in. diameter jars per minute. This capacity is reduced to approximately 240 per minute on eight paneled ketchup bottles. Floor space occupied by this unscrambling unit is 4 ft. 4 in. by 8 ft. 4 in.



Foot pedal operated heating iron.

IF YOU NEED A LaBOUR NOTHING ELSE WILL DO

Experience in the process industries for nearly twenty-five years has demonstrated that only a LaBour Pump can make good on the kind of job LaBours are built to do.

. . . If you need the rapid, dependable priming for which LaBours are noted, you can't get it without a LaBour Pump.

. . . If you need the complete absence of packing or rubbing seal provided by LaBour Type G, there's no substitute for LaBour.

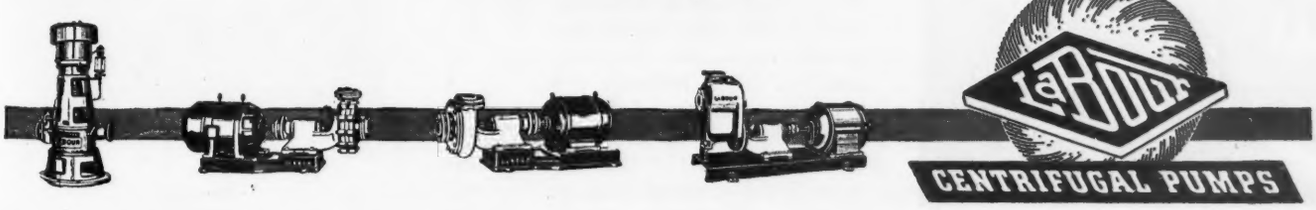
. . . If you need efficiency with an open impeller such as LaBour delivers, you get it only with a LaBour.

. . . If you need vapor capacity to prevent binding, one of the features of LaBour Type Q, no other non-priming pump can supply your needs.

Old-timers in the industry know the truth of these facts. They are facts worth remembering because they can save you a great deal of time and money when you buy or specify pumps.

THE LABOUR COMPANY, INC.

Elkhart, Indiana, U.S.A.

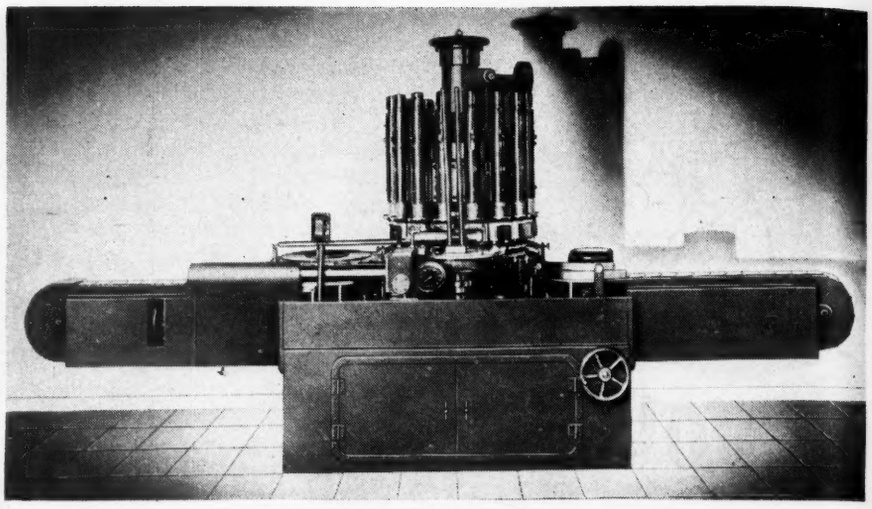


MERCOID CONTROLS

Mercoid Controls are first choice among leading engineers throughout industry. They are used on industrial applications involving the control of temperature and pressure. Available in various ranges. Controls also for liquid level, etc.

Hermetically sealed mercury switches used exclusively in all Mercoid Controls. They are not affected by dust, dirt or corrosion, thereby assuring better control performance and longer control life. Complete catalog sent upon request.

MADE BY THE MERCOID CORPORATION 4221 BELMONT AVE. CHICAGO 41, ILL.



Sixteen spindle rotary sealing machine

Rotary Capping Machine

ANCHOR HOCKING GLASS CORP., Dept. I, Lancaster, Ohio, announce a 16-spindle rotary sealing machine. This capping machine is designed for either steam or mechanical vacuum application of Anchor Caps to glass jars and bottles. It is completely automatic in operation and caps from 200 to 500 jars per minute. Cap sizes range from 28 mm. to 89 mm., and glass containers from 3 in. to 8½ in. high and diameters from 2 to 4¼ in. can be accommodated.

When the steam vacuum method of sealing is used a vacuum chamber in the sealing head encloses the jar shoulder and finish and produces an absolute penetration of steam into the headspace. With the head completely filled with steam, the cap is applied to the container finish, forming a perfect seal. Anchor AH-N Caps are stacked in the magazine and the feed is automatically controlled by the jar.

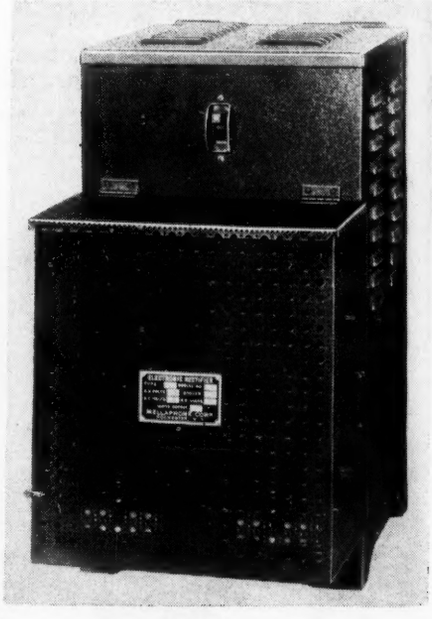
An adjustable main valve permits the degree of vacuum to be regulated to fit the requirements of the product packaged. The vacuum chamber seals around the shoulder of the container eliminating the need for vacuumizing the jar's entire outer area. The vacuum valve and feed lines are so arranged that it is possible to draw a vacuum within ½ in. of the vacuum in the supply tank.

The conveyor chain on this machine is a two-plane type that permits a continuous container transfer throughout the machine. At the intake, containers are fed into the machine by a helicoid timer which permits random feeding at any speed the rest of the line can take. The sealing action of the machine is entirely accomplished by the machine spindles. The container travels through the machine on one plane and is not lifted or rotated. Commercial vacuum is easily maintained at all operating speeds.

A tachometer, in full view of the operator, indicates actual speed of operation. The precise mechanical sealing action of the machine and the use of superheated steam eliminate the need for a water bath or spray. The construction is such that it permits the use of prelabelled packages through the machine, without causing damage.

Rectifiers

MELLAPHONE CORP., Dept. I, Rochester 2, N. Y., announces a line of rectifiers designed to convert a.c. current into d.c. for industrial use. These rectifiers provide an ideal source of power for energizing such



Rectifier

Fiberglas-insulated bake ovens in one of America's large universities. Product of The G. S. Blodgett Co., Inc., Burlington, Vermont.

How BETTER EQUIPMENT INSULATION *makes Better Cooks*

Any cook—he-man or housewife—will tell you that an important part of success in baking depends upon the precise control of oven temperatures . . . and this depends upon *insulation.*

There's good reason why Fiberglas Insulation is preferred for domestic ranges and for the bake ovens, vessels and other equipment installed in food-processing plants, commercial bakeries, hotels and institutions.

Made of fine fibers of glass interlaced into soft, fleecy blankets, Fiberglas Insulating Wool combines *high insulating efficiency* with *light weight.* Being glass, the fibers will not corrode, are non-corrosive to metals in the presence of moisture. And Fiberglas Insulation is resilient, doesn't settle or pack down leaving voids through which heat can escape. Fiberglas is in there to stay!

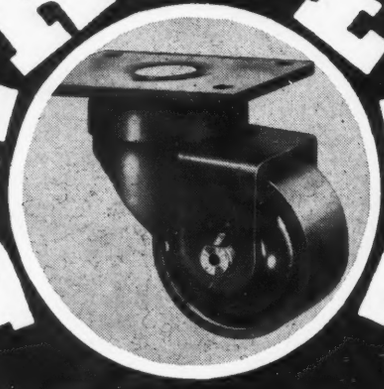
And on boilers and processing lines, too, Fiberglas Metal Mesh Blankets, PF Pipe Covering and Insulating Cements are playing their economic role in the food-processing industry. Write for "Fiberglas Insulations for Industry": Owens-Corning Fiberglas Corporation, Dept. 2009, Toledo 1, Ohio. Branches in principal cities. *In Canada: Fiberglas Canada Ltd., Oshawa, Ont.*

OWENS-CORNING

FIBERGLAS

TM REG US PAT OFF

DARNELL



CASTERS

Darnell Casters and Wheels are pre-tested for efficiency and durability—you are assured a long life of satisfactory service.

Free DARNELL MANUAL

A SAVING AT EVERY TURN

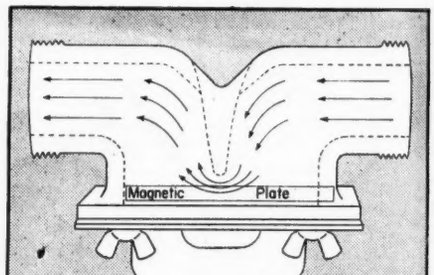
DARNELL CORP. LTD. 60 WALKER ST., NEW YORK 13, N.Y.
LONG BEACH 4, CALIFORNIA 36 N. CLINTON, CHICAGO 6, ILL.

equipment as magnetic separators and lifting magnets.

Tubes for these units are mounted outside the main housing and are protected by a perforated metal grill. This method insures proper ventilation and freedom from arc backs under full load. Heavy duty mercury vapor tubes are used to provide high efficiency, good voltage regulation and long life. Standard models, containing no moving parts, are in stock for nearly any standard voltage and current requirement.

Sanitary Magnetic Trap

COLUMBIA ENGINEERING SERVICE CO., Dept. I, 593 Market St., San Francisco, Calif., announces a new stainless steel sanitary magnetic trap. It



Sanitary magnetic trap.

affords protection from ferrous metals such as nails, wire and similar material. The magnetic force is supplied by the powerful Alnico permanent magnets. All surfaces that contact food are highly polished stainless steel to meet the sanitary requirements of the food industry.

Fire Extinguisher

RANDOLPH LABORATORIES, INC., Dept. I, 8 E. Kinzie St., Chicago 11, has produced a trigger-touch 15-lb. CO_2 fire extinguisher. It is portable and is operated uninterruptedly with single-sweep action. By grasping the unit by its arched-steel handle the extinguisher can be removed from its bracket and carried with one hand. The other hand is free to re-

Specify STAINLESS for protection of product purity

Specify GLOBE for Stainless Steel Tubes of uniformity and quality

OUTSTANDING for protection against corrosion and product contamination, stainless steel tubing has won an important place in the production and processing of America's foods, beverages, chemicals, oils, and other process products.

Stainless steel tubing has no cracks or crevices and because the walls are stainless steel straight through, daily scouring only adds to its polish and keeps it brightly clean and sanitary. Since it has no coatings to wear through stainless steel tubing develops no pockets to harbor bacteria.

Since stainless steel tubes are available in many analyses, care should be taken in selecting the stainless steel tubing of the right alloy for a specific application.

Globe stainless steel tubing is available polished inside and out in both seamless and welded (Gloweld) types.

With Globe's wide experience in supplying industry with stainless steel tubing of uniformity and quality you can be sure of safety and sanitation when you specify "GLOBE."

Write for Bulletin No. 115 giving complete information on Globe stainless steel tubing.

GLOBE STEEL TUBES CO., Milwaukee 4, Wis., U. S. A.

3010

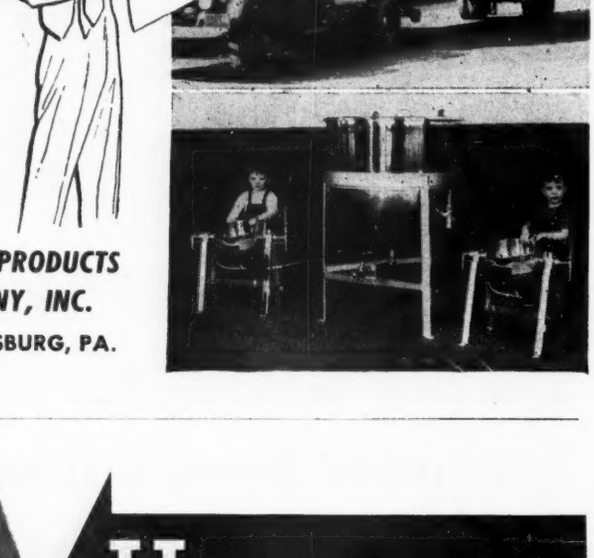
GLOBE STEEL TUBES

GLOBE TUBES

★ Pressure Tubes
★ Condenser & Heat Exchanger Tubes
★ Seamless Stainless Steel Tubes
★ Globeiron High Purity Iron Seamless Tubes
★ Gloweld Welded Stainless Steel Tubes
★ Mechanical Tubing

LEE
DESIGNS AND BUILDS

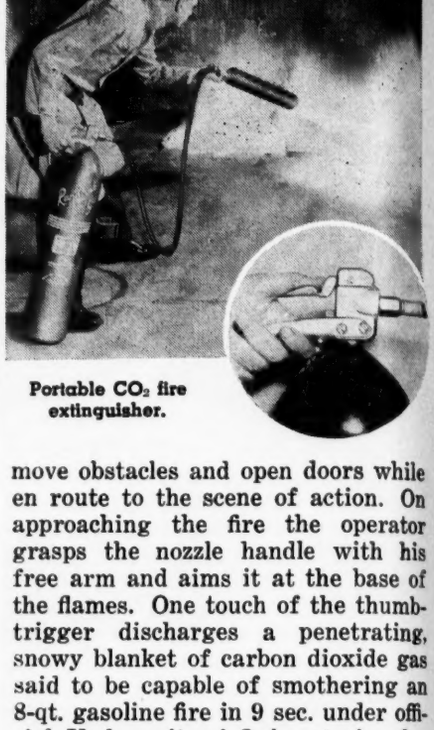
- JACKETED KETTLES
- "NOCOIL" JUICE AND BRINE TANKS
- PULP AND STORAGE TANKS
- JACKETED TANKS
- AGITATORS AND AGITATOR KETTLES
- FLUSH TYPE VALVES
- VACUUM PANS
- SPECIAL EQUIPMENT TO CUSTOMER'S SPECIFICATION—FROM STAINLESS STEEL



Lee is now in position to make reasonable deliveries on your most urgently needed stainless steel kettles. All Lee kettles are made to A.S.M.E. Code and certificates furnished with each job.

Let LEE ENGINEERS Work with you NOW!

LEE METAL PRODUCTS COMPANY, INC.
415 PINE ST. PHILIPSBURG, PA.

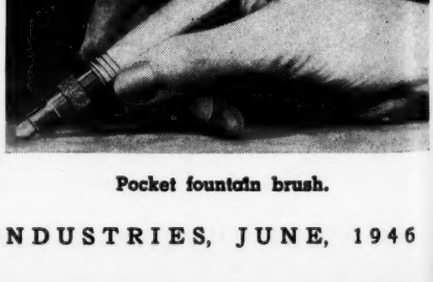


Portable CO_2 fire extinguisher.

move obstacles and open doors while en route to the scene of action. On approaching the fire the operator grasps the nozzle handle with his free arm and aims it at the base of the flames. One touch of the thumb-trigger discharges a penetrating, snowy blanket of carbon dioxide gas said to be capable of smothering an 8-qt. gasoline fire in 9 sec. under official Underwriters' Laboratories fire tests. Release of the trigger automatically stops the flow and saves the remainder of the charge.

Pocket Fountain Brush

CUSHMAN & DENISON MFG. CO., Dept. I, 133 W. 23rd St., New York 11, announces a pocket fountain brush as a marking medium. It is no larger than an ordinary fountain pen, with valve control that is said to eliminate leaking, flooding and sweating. It is made of satin-finished aluminum and consists of three unit parts. It is designed to be used only with "Cado Flo-Dri" colors that are said to be instant drying, waterproof, freezeproof and smearproof. It is suitable for marking surfaces such as wax paper, cellophane, brass, metal, all kinds of coated papers, aluminum foil and similar surfaces. It combines the advantages of ink and crayon.



Pocket fountain brush.

PlasTex

Here's the modern answer to all food conveying problems

• PlasTex—The miracle belting with the plastic coating

Yes, now you can carry hot or cold, wet or dry substances of every nature month after month with this remarkable, fully pliable plastic coated belting. It won't pick up odors—cleans easily—lasts many times longer than uncovered belting.

Join leading food processors already enjoying the benefits of PlasTex in their plants.

Write for free sample and the name of your nearest supplier. Dept. C.

BUFFALO WEAVING & BELTING COMPANY
Chicago Buffalo 7, N. Y. New York
Serving Industry for Over Fifty Years

Glass packed Foods sell themselves

SHE saw at a glance the result of your painstaking efforts to give her the very best product possible. All her questions were answered before she had an opportunity to ask or even think them . . . Uniformity? Texture? Size? Color? Liquid content? . . . In one fleeting instant your product caught her attention, aroused her interest and got her decision. Her subconscious mind whispered "Yes" and she had your product in her market basket before she knew what had happened.

That's impulse buying at its best. That's the way Anchorglass Containers can help sell your products. They give you sparkling clear visibility and complete protection at the same time.

The Anchorglass Container is easy and safe to open and can be tightly resealed to protect unused portions of food. It's a convenient, sanitary, attractive package that honestly reveals the nature, quality and quantity of its contents.

Anchor
CONTAINERS and CAPS

Tune in ANCHOR HOCKING'S HOBBY LOBBY CBS NETWORK . . . THURS. EVE.

PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO

PERFECTED SANITATION
Planned For You

2F ELL . . . Another approved Sanitary 3-A Standard Fitting

TRI-CLOVER solid one piece construction at the point of strain eliminates any possible parting of the No. 14 seat from the Ell. There is no fabricated joint for cracks or crevices to develop.

TRI-CLOVER engineers were not satisfied with merely meeting the 3-A Sanitary Standards. From their drafting boards has come an improved type of construction that holds up under extreme stress and strain. It is to your advantage to prevent breakdowns and loss of production by insisting upon TRI-CLOVER. A new, complete TRI-CLOVER catalogue will be published soon, covering the entire line of Sanitary Fittings, Pumps, Tubing, Tools and accessories. May we have the pleasure of reserving a copy for you?

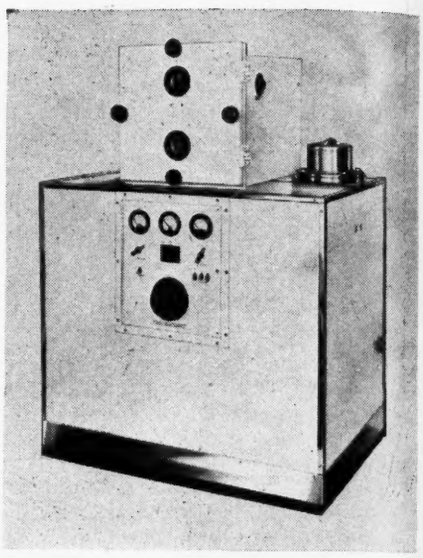
TRI-CLOVER Stainless Steel and Tri-Alloy Fittings accepted by the Appropriate Committees of the International Association of Milk Sanitarians, U.S. Public Health Service, and Dairy Industry Committee. Designated as meeting the 3-A Sanitary Standards.

2-C Bend	7-B Tee	15-R Ferrule
2-F Bend	9 Cross	16-A Cap
2-K Bend	10-BF Valve	30-F Angle Valve
2-P Bend	10-C Valve	31-15 Reducer
7 Tee	11-C Valve	32-15 Reducer
7-A Tee	13-H Hex Nut	33-F Can Filler
	14-R Ferrule	

The above listed Fittings also approved in the gasket seat construction.

Try TRI-CLOVER

TRI-CLOVER MACHINE CO.
KENOSHA, WISCONSIN
"The Complete Line"
Sanitary FITTINGS • VALVES • PUMPS



Complete experimental dehydrater.

Laboratory Dehydrater

NATIONAL RESEARCH CORP., Dept. I, 100 Brookline Ave., Boston 15, Mass., offers a small dehydration unit for laboratory or pilot production. The unit is a complete "package" equipment for the desiccation or concentration of heat-sensitive biologicals, antibiotics, food products and fine chemicals. Time required to pump down to 200 microns of Hg. from atmospheric pressure is 4 minutes and the blank-off is 1 micron or less. Water vapor is handled by a carbon dioxide and acetone (or alcohol) cold trap with a capacity of 4 lb. of ice.

Three thermocouple gages, at the fore pump, diffusion pump and cabinet indicate vacuum conditions. Provision for four thermocouples in the cabinet permits control of heat input. All controls and gages are located on a central control panel.

The drying cabinet measures 16 in. x 16 in. x 24 in. All mechanism is enclosed in a housing finished inside and out with white baked enamel.

Colony Counter

MEETING needs of the food and allied industries, where mold count work is essential, the American Optical Co., Dept. I, Buffalo 11, N. Y., is offering the Spencer dark field colony counter. It represents an improvement in design and illumination as well as in general construction.

It is styled to conform with modern laboratory instruments. It is cool to operate and is sturdily built of sheet steel. The front surface is inclined at an angle found to be most convenient to the average technician. The scientifically designed reflector provides illumination, free from glare, and is said to be uniform over the entire field and adequately re-

PREVENTS SUDDEN BREAKDOWNS

DISORGANIZING plant failures are forestalled by York Certified Maintenance. For your York-trained Maintenance Inspector gives your equipment a regular step by step inspection... corrects minor troubles before they lead to costly interruptions . . . cuts the cost of maintenance and operation.

Under this tested system continuous and efficient plant operation is assured . . . maintenance costs controlled. Your York Maintenance Inspector keeps a complete record of everything he does to maintain your plant at peak efficiency. He assumes all responsibility . . . *saves you from snarling your executive time with mechanical detail.* Write for the complete list of advantages of York Certified Maintenance. York Corporation, York, Pennsylvania.

YORK REFRIGERATION AND AIR CONDITIONING

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

york refrigeration air conditioning — Certified MAINTENANCE

YORK CORPORATION, YORK, PENNSYLVANIA

I am interested in learning more about the York Certified Maintenance Contract.

Name_____ Position_____

Co. Name_____

Street and No._____

City_____ State_____

What . . .

roller expand heat exchanger tubes this small?

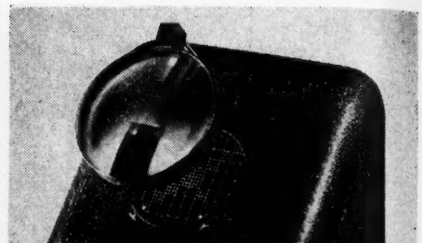
A watchmaker's job? You might call it that. Roller expanding ¼ and ⅜ inch tubes into tube sheets *is* a delicate operation . . . *does* require careful control and extraordinary skill.

But Ross is known for such leadership . . . not only in roller expanding tubes, but in the design and manufacture of the expanding tool itself. That's the very reason you have the same permanently tight tube joints in all Ross heat exchangers, large or small, regardless of tube sizes.

Over 50,000 heat exchangers, with ¼ inch roller expanded tubes, have been built by Ross . . . . and over 30,000 more with ⅜ inch tubes for the U. S. Navy (to U. S. N. Spec. 66-C1).

Ross Heater & Mfg, Co., Inc., 1443 West Ave., Buffalo 13, N. Y. Division of American Radiator & Standard Sanitary Corp. In Canada, Ross equipment is manufactured and sold by Horton Steel Works Ltd., Fort Erie, Ontario.

HEAT EXCHANGERS
COOLERS
HEATERS
CONDENSERS
ROSS



Spencer dark field colony counter.

vealing and distinguishing small colonies from other structures. Great emphasis has been laid on correct illumination to facilitate counting and to reduce fatigue. Wolffhiegel, Steward or Jeffers guide plates are now available.

Interlined Blankets

FIBERGLAS interlined blankets, in any size or shape suitable for the transportation of frozen foods by freight or by truck, are being produced by Aeronautical Supplies, Inc., Dept. I, Empire State Building, New York City. Duck or Vinyl-coated styles are available with waterproof linings. These Fiberglas insulated blankets are said to offer a perfect solution for the problem of shipping frozen foods in less than carload lots or for delivering them from the warehouse when refrigerated trucks are not available.

Immersion Heater

AMERICAN INSTRUMENT CO., Dept. I, Silver Spring, Md., announces an automatic electric immersion heater for liquids. This heater and its automatic control, combined in one self-contained unit, is adaptable for use in water tanks, drums, processing kettles, stills, sterilizers, and for similar applications. The built-in safety control will limit the temperature rise of the heater and thus protect it against overheating and burning out should the liquid level fall and expose the heating element to air.

The heater can be easily and quickly screwed into the walls of a tank, drum, etc., through a 1-in. pipe fitting or reducer. Only two wires need be connected from the current supply to the heater. Two or more of the heaters may be installed in one application. By turning an indicating screw, the heater can be set as desired from room temperature to

for Brewery or Food Plant . . .
it's CRANE for Piping Materials

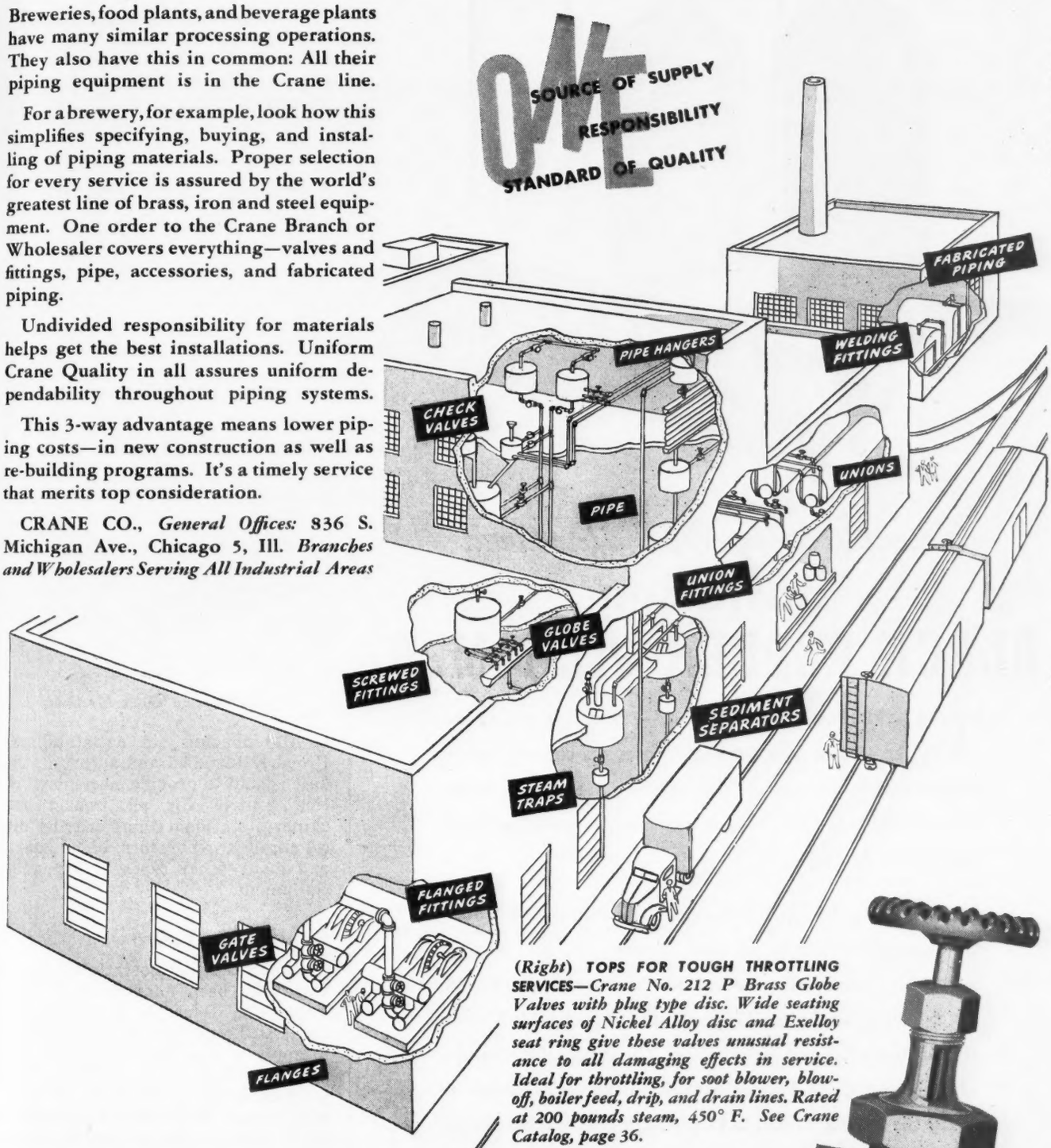
Breweries, food plants, and beverage plants have many similar processing operations. They also have this in common: All their piping equipment is in the Crane line.

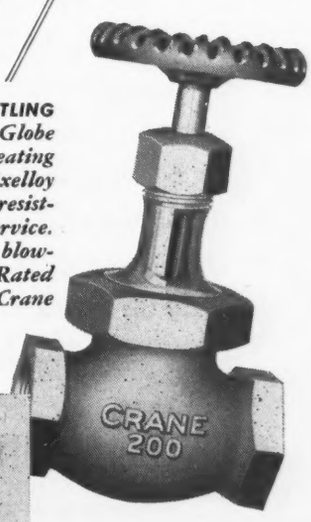
For a brewery, for example, look how this simplifies specifying, buying, and installing of piping materials. Proper selection for every service is assured by the world's greatest line of brass, iron and steel equipment. One order to the Crane Branch or Wholesaler covers everything—valves and fittings, pipe, accessories, and fabricated piping.

Undivided responsibility for materials helps get the best installations. Uniform Crane Quality in all assures uniform dependability throughout piping systems.

This 3-way advantage means lower piping costs—in new construction as well as re-building programs. It's a timely service that merits top consideration.

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas*





(*Right*) **TOPS FOR TOUGH THROTTLING SERVICES**—*Crane No. 212 P Brass Globe Valves with plug type disc. Wide seating surfaces of Nickel Alloy disc and Exelloy seat ring give these valves unusual resistance to all damaging effects in service. Ideal for throttling, for soot blower, blow-off, boiler feed, drip, and drain lines. Rated at 200 pounds steam, 450° F. See Crane Catalog, page 36.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

Scientifically Manufactured

Imitation BLACK PEPPER OIL MM&R

THAT PRESSING pepper problem — solved for you at last by the MM&R laboratories! All over the country, manufacturers who have felt the pepper pinch are turning to the new, scientifically exact pepper replacement—Imitation Black Pepper Oil MM&R.

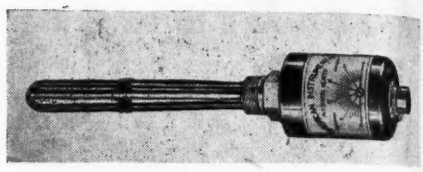
In flavoring strength, Imitation Black Pepper Oil MM&R is amazingly similar to oil black pepper . . . may be used pound-for-pound as the natural oil. For character and quality, it lives up to the usual high standard of all MM&R scientifically manufactured replacements. The remarkable economy of Imitation Black Pepper MM&R further recommends it. Write the MM&R Technical Department for complete details.

MAGNUS, MABEE & REYNARD, INC.

SINCE 1896 . . . ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 DESBROSSES STREET, NEW YORK CITY • 221 NORTH LASALLE STREET, CHICAGO

LOS ANGELES: BRAUN CORP. • SEATTLE, PORTLAND, SPOKANE: VAN WATERS & ROGERS, INC.
SAN FRANCISCO: BRAUN-KNECHT-HEIMANN-CO. • CANADA: RICHARDSON AGENCIES, LTD., TORONTO

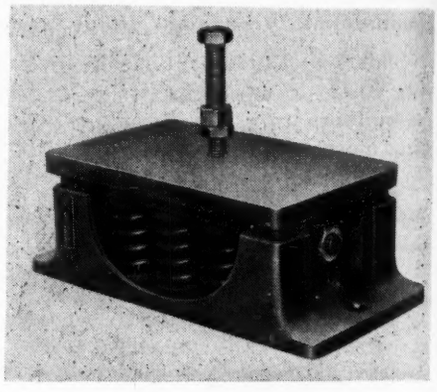


Automatic electric immersion heater.

350 deg. F. The temperature of liquids will be maintained within plus or minus 5 deg. F. from the temperature at which the instrument is set.

Vibration Shock Absorber

KORFUND CO., INC., Dept. 1, 48-15 32nd Place, Long Island City 1, N. Y., announces a simplified steel spring vibration isolating unit. Type LK is designed in 26 sizes for rated loads of 75 to 12,000 lb. Adjustable resilient chocks in the four corners



Vibration and shock absorber.

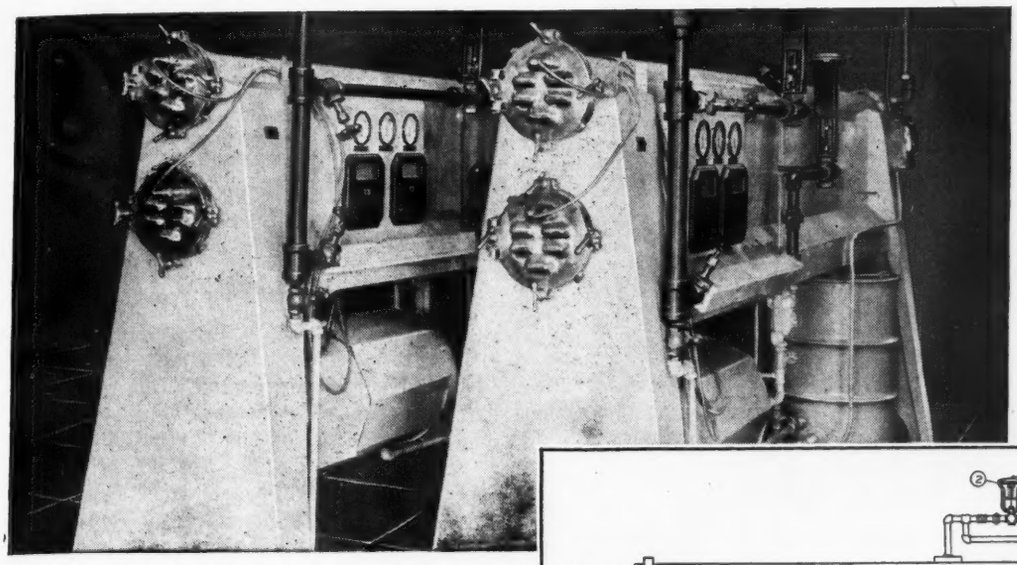
of the housing act as stabilizers. Properly installed and adjusted, this unit is said to provide efficient vibration control for all impact machinery, stationary and marine diesel engines, generators, panel boards and many other types of industrial equipment.

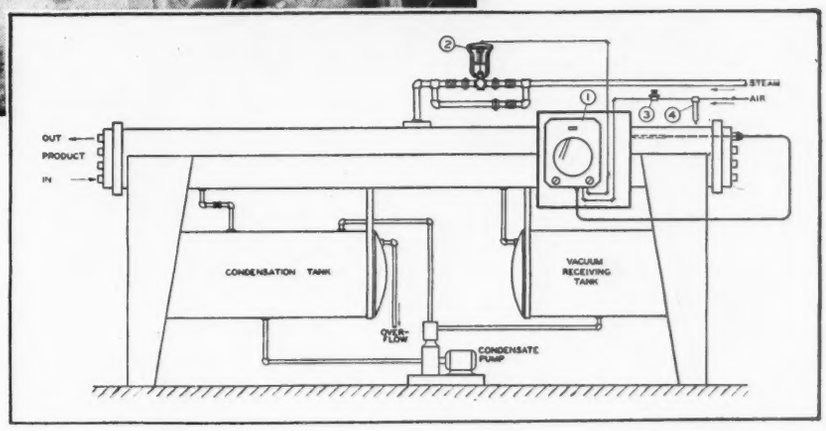
Expansion Valve

AN improved thermostatic expansion valve has been announced by Alco Valve Co., Dept. I, 865 Kingsland Ave., St. Louis, Mo. Made at present to apply in the field of smaller commercial refrigeration, and covering a nominal range of Freon-12, of ¼ ton to 1½ tons, the outstanding feature of the valve is the automatic limitation of evaporator or suction pressure. It is said to eliminate the heavy overload on the motor during the starting or "pull-down" period.

The heart of the valve is a pressure-limiting "cartridge" which consists of a pressure-charged bellows, a valve push-pin, and a spring. Various cartridges, each charged to a predetermined pressure, ranging

Two ways to look at Taylor's JUICE HEATER control!





NO matter how you look at it, you can't beat this Taylor System for maintaining the final juice temperature you need for uniformly good flavor. In addition, it will give you a saving in steam, complete elimination of manual operation, and maximum protection against "burning on" or scorching.

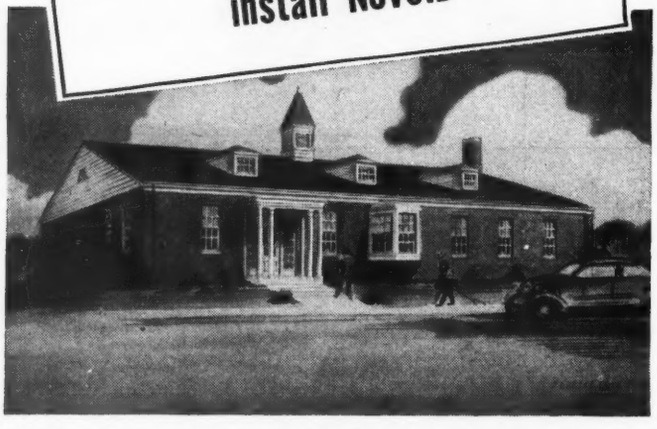
We designed this control system for the Chisholm-Ryder Company of Niagara Falls for steam vacuum type heaters. The Taylor Fulscope Controller holds the final juice temperature at the desired point, even during complete stoppage of flow. You can use Fulscope *Indicating* Controllers as shown in the photograph. Or you can go all out and have a Fulscope *Recording* Controller, as shown in the drawing. This will not only maintain precise control but will give you a minute-by-minute record of the temperatures maintained—a complete *permanent* check on the efficiency of equipment and operators.

For years Chisholm-Ryder, like so many other food equipment manufacturers, have relied on Taylor Instruments to help assure maximum efficiency of their food processing equipment. Make sure *you* get Taylor Accuracy. Whatever processing equipment you need, just specify "Taylor-Equipped as usual!" Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

All over America
leading Insulation Contractors
install NOVOID



Above are shown the employees of the Bonitz Insulation Company, Greensboro, N. C. And below is the architect's sketch of a standardized locker plant developed by Southern Frozen Food Lockers, Inc., for which Bonitz furnishes the Novoid Corkboard Insulation and Novoid Cork Pipe Coverings. More than 25 of these plants have been sold and will soon be operating in the Carolinas.

* * *

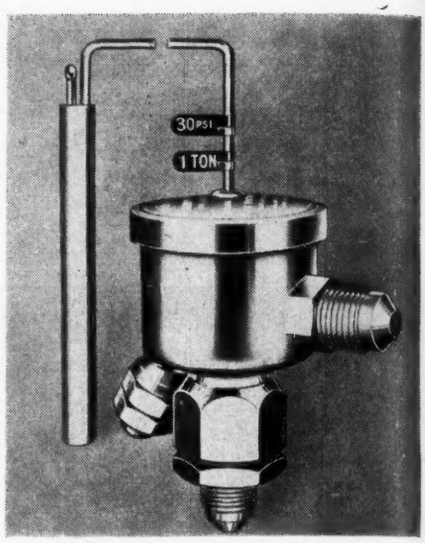
NOW AVAILABLE for prompt delivery are many sizes and thicknesses of Novoid Cork Pipe Covering. From coast to coast, better independent insulation contractors can sell you this highly efficient insulation for cold lines.

Novoid Covering is the moulded rigid insulation that reduces your cost of refrigeration. It snugly hugs pipes and fittings of every size and shape, does not sag, does not absorb moisture or odors, and is long-lasting.

For complete facts about Novoid Pipe Covering, Corkboard, and sundries especially developed to make low temperature insulations most efficient, write to Cork Import Corporation, 330 West 42nd Street, New York City.

NOVOID INSULATION

CORKBOARD • PIPE COVERING



Improved thermostatic expansion valve.

from 10 to 55 lb. per sq. in., are interchangeable on the job.

Excessive pressure built up in the low side of a system during the "off" cycle reacts on the cartridge bellows, closing the valve when the predetermined evaporator pressure is reached. When the compressor starts, the valve remains closed until the evaporator pressure is reduced below the valve setting. As the pressure is further reduced, the valve begins to open and gradually shifts from pressure control to the normal function of superheat control.

Some of the principal fields of application include: display cases, walk-in coolers, freezers of various types, beverage coolers and refrigerated trucks.

Bag Inserter

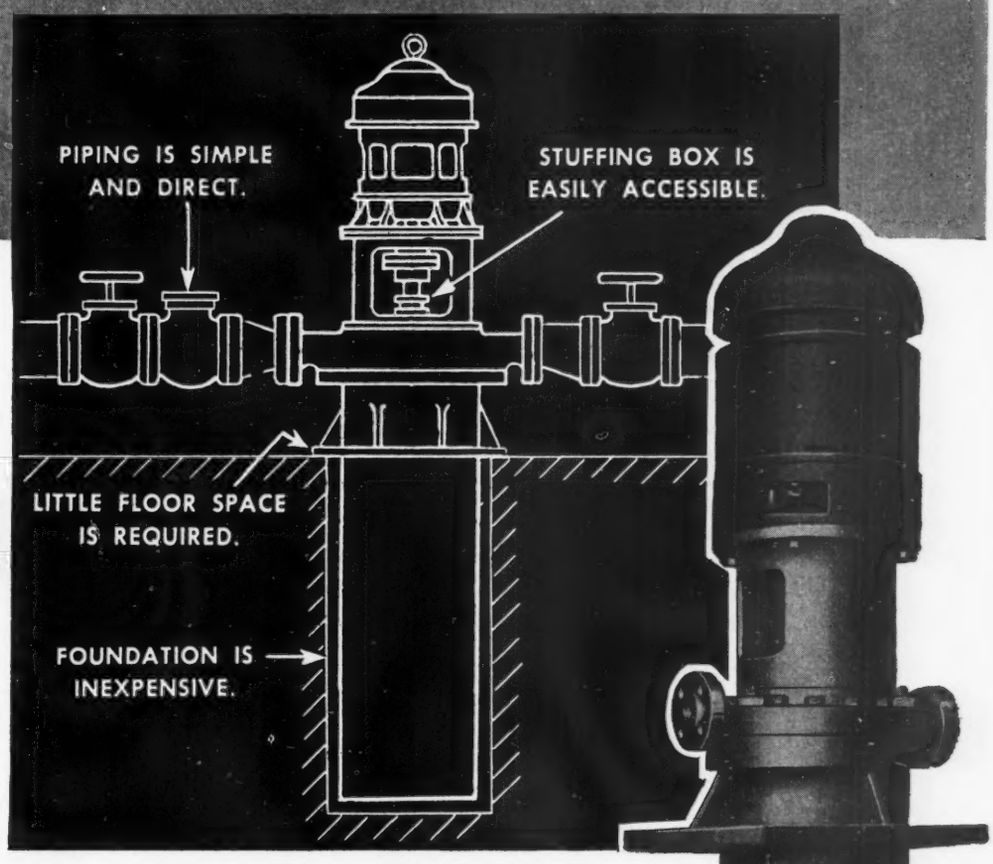
BENJ. C. BETNER Co., Dept. I, Devon, Pa., announces a new automatic high-speed bag inserter designed for opening and placing a liner bag in a carton. The machine is entirely automatic and takes a bag from a magazine, opens it, squares it up completely at the bottom and inserts it into a glued carton. The bag-in-carton combination is then placed mechanically on a conveyor to be taken to the filling operation. The machine will operate over a 4-in. or wider conveyor belt at speeds from 35 to 70 a minute, depending upon the size of the bag and carton.

Differential Flow Meter

THE Bristol Co., Dept. I, Waterbury 91, Conn., announces the addition of a bellows-differential flow meter to its line of mercury manometer flow meters. The meter body, said to operate on a new principle, requires no mercury in its operation. A unique method of transmitting bellows mo-

for **LOW-CAPACITY HIGH-PRESSURE**

PUMPING JOBS


PIPING IS SIMPLE AND DIRECT.
STUFFING BOX IS EASILY ACCESSIBLE.
LITTLE FLOOR SPACE IS REQUIRED.
FOUNDATION IS INEXPENSIVE.

VERTICAL MULTI-STAGE PUMPS

Many industries have pumping problems requiring a pump of moderate capacity for comparatively high pressures. Among the applications of this type are desuperheater, heater drip, evaporator, booster, small boiler-feed and process-industry pumps. They are also ideal for many applications where hydraulic pressure is required to operate presses.

For these services I-R vertical multi-stage pumps will in many cases have a much higher efficiency than a conventional horizontal pump. They will thus pay for themselves by the saving in power costs.

Vertical design simplifies installation and piping and saves space.

These pumps are available in capacities from 20 to 375 gal per min for pressures as high as 1500 lb per sq in.

An Ingersoll-Rand engineer will be glad to tell you more about them.

10-569

Ingersoll-Rand

Cameron Pump Division 11 Broadway, New York 4, N. Y.

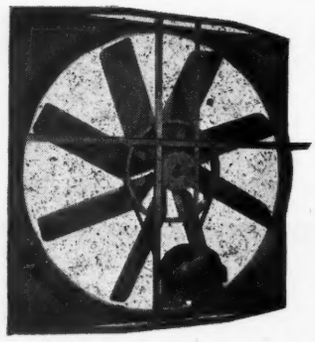
COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • OIL AND GAS ENGINES

BREEZE-CONDITION

your workrooms and offices with

Coolair
TRADE MARK

EXHAUST FANS



In long buildings or any large building where air is pulled in from all sides, the Coolair Type O fan illustrated above, in a multiple unit instaliation on the roof, will effectively distribute air circulation and provide required air velocity for cooling.

Multiple unit installations in side walls and window openings also give excellent results in cooling large areas by cross ventilation.

Ask for more information about these and other Coolair units ranging in size from 16 inches to nine feet in diameter. Call in your Coolair dealer or agent, or write us at the factory.

ENGINEERS and ARCHITECTS
For descriptive and technical data see:
SWEET'S CATALOG (Architectural File)
A.S.H.V.E. GUIDE
ELECTRICAL BUYER'S REFERENCE

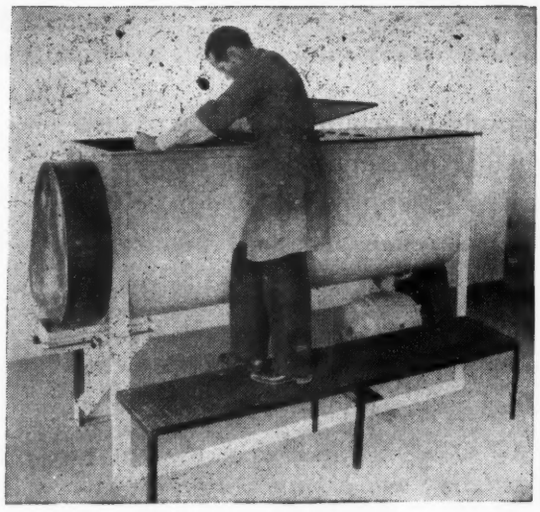
AMERICAN COOLAIR CORPORATION

"Pioneer Manufacturers of V-Belt Drive Exhaust Fans".

3604 Mayflower Street **Jacksonville 3, Florida**

IMMEDIATE DELIVERY

on New DO-ALL Ribbon Mixers and Blenders



Write

Wire

Phone

These new spiral type machines are available for wet or dry mixing. Of rugged welded steel construction, they are built for hard service. Come in 25 to 2,000 lb. sizes, standard or heavy duty. Send NOW for full information.

D. B. LEWIS CO.

Industrial Machinery

3402-06 S. Avalon Bldg. **Los Angeles 11, Calif.**

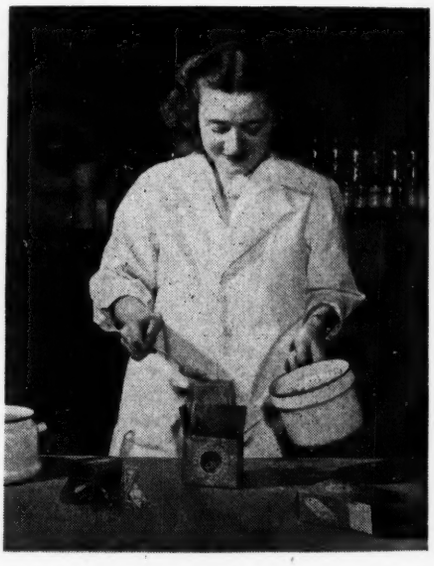
tion to the pen arm is employed which completely isolates the meter-body shaft from the measured fluid.

Underfeed Stoker

ERIE CITY IRON WORKS, Dept. I, Erie, Pa., announce two lines of underfeed stokers: (1) Ram Type L single retort, side dump underfeed stoker is available for power boilers to 360 hp.; (2) Type H is of heavier design to carry loads up to the maximum usually required of a single retort underfeed stoker. They are available in a wide selection of lengths and widths.

FF Pliofilm

DEVELOPMENT and production of a new type pliofilm known as "FF pliofilm," particularly adapted for frozen foods, was announced by the Goodyear Tire & Rubber Co., Dept. I, Akron, Ohio. This material is said to remain flexible at –20 deg. F. It possesses the same heat sealing qualities of the conventional pliofilm and in addition can be sealed against the frozen product. Tests are said to show that moisture transmission at this low temperature is practically eliminated. Refrigeration burn to food which is due to dehydration is said not to occur with this material when packaging is properly done.



FF pliofilm for frozen foods.

Bread Wrappers

AVAILABLE now is a combination of cellophane and waxed paper that permits the product to be displayed in a virtual showcase of its own. This is announced by Milprint, Inc., Dept. 1, Milwaukee 1, Wis. The consumer can see the bread through the transparent cellophane section. The wrap-

For that
"After School
Snack"
Kids really go for this easy to use Cloverdale Honey Spread. It's 100% pure honey, but spreads just like butter . . . a handy solution to the between meal appetite problem.
Cloverdale Honey Co-operative, Inc. of Fredonia, N. Y., packers of Cloverdale Honey Spread, have made their product still more convenient to use by sealing it with Crown Screw Caps. Crown *patented* Deep Hook Thread Screw Caps seal tighter and are more easily removed. Crown Cork & Seal Company, Baltimore 3, Maryland. *World's Largest Makers of Metal Closures.*
Cloverdale
HONEY SPREAD
CROWN CLOSURES

Available in 5-lb. cans 100-lb. drums
Easy to use
A great Bactericide in the FOOD INDUSTRY
CONTENTS 5 LB. NET
PERCHLORON
A Stable Calcium Hypochlorite Powder for use as a Bactericide and Deodorant
PENNSYLVANIA SALT MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA

PERCHLORON is a desirable source of chlorine, quick acting and not injurious to metals, at recommended concentrations. Perchloron will not impart odors or flavors to food products which contact sterilized utensils.

AS A BACTERICIDE, PERCHLORON IS USED IN:

Milk separators and ice cream freezers

Cream and cheese factory utensils

Preserving, baking and candy-making utensils

Bottle washing equipment

Cannery equipment

Tanks and tank cars

Tables, shelves and floors

Other Penn Salt Products for the Food Industry

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G M Kleanser
Anhydrous Ammonia
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PENNSYLVANIA SALT MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA 7, PA.
New York • Chicago • St. Louis • Pittsburgh • Cincinnati • Minneapolis • Wyandotte • Tacoma

Cellophane and waxed paper wrappers.

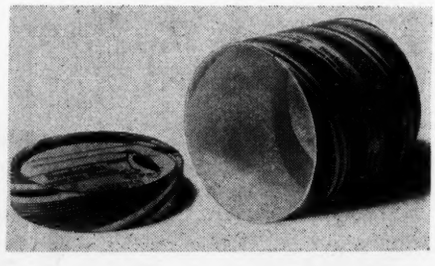
per is known as "Milprint Revelation." This packaging development is adaptable for general bakery goods, bacon wraps and other similar consumer goods.

Aluminum Wrap

THE all-aluminum packaging foil developed by Reynolds Metal Co.; Dept. I, Richmond, Va., is now offered as a wrapping material especially for frozen foods, which is said to be a positive barrier against moisture vapor, air, light and odors. It permits up to 25 percent faster freezing, depending on conditions and method of freezing. Preventing dehydration because it is fully moldable, it hugs the product closely at every point and eliminates air pockets that cause dehydration. It is non-absorbent, is not affected by temperature and stays flexible. Neither heat-sealing nor tying are required. It is said to have re-use value for a number of uses in the home. It can be washed and re-used to cover odd-sized food containers, left-over foods and fresh vegetables for the refrigerator.

Frozen Food Container

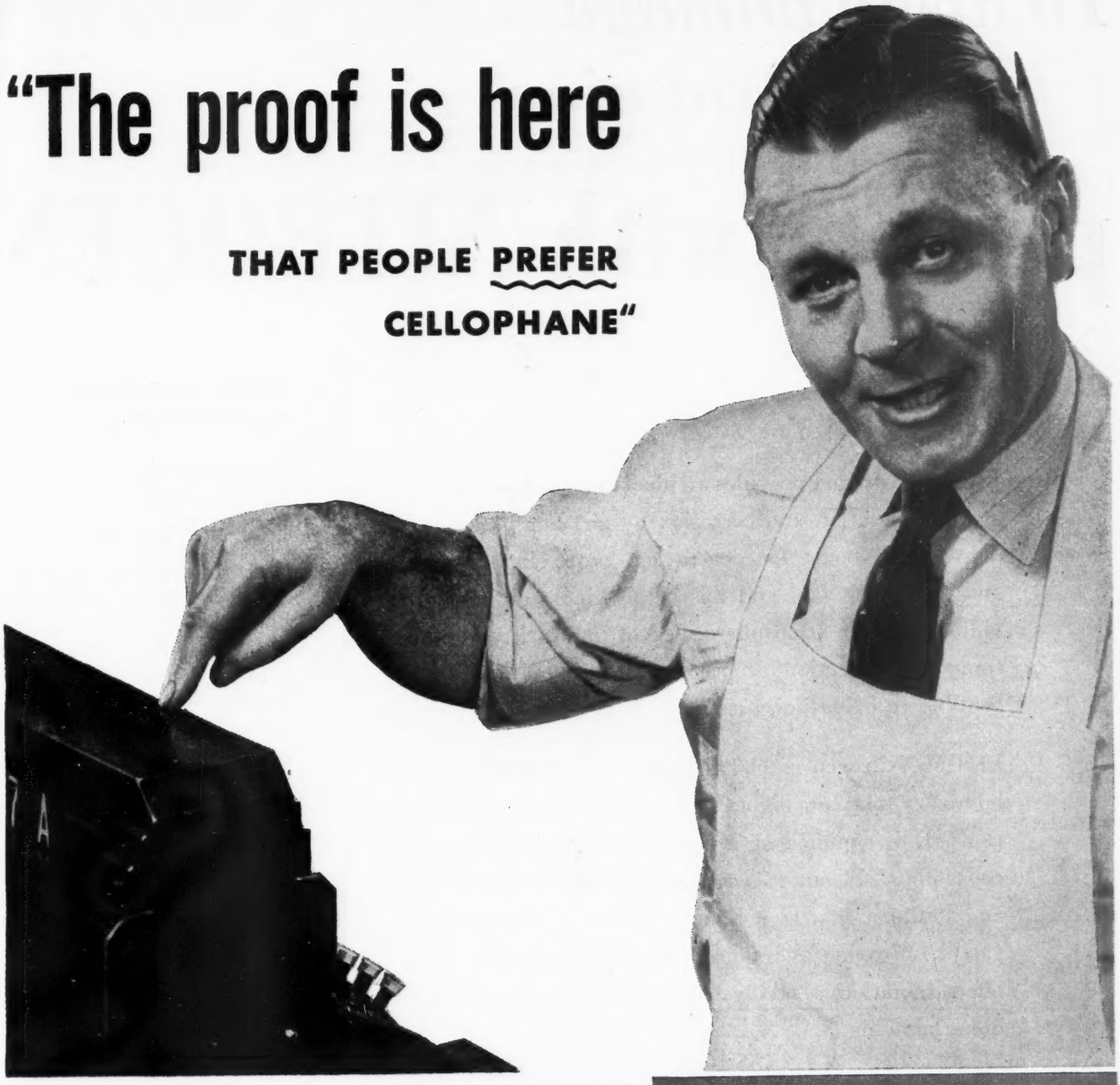
SEALRIGHT CO.,INC., Dept. I, Fulton, N.Y., has introduced an improved frozen food container with a special laminated inner surface designed to check moisture-vapor loss. This improvement is said to eliminate the need for a hand-inserted liner. The container liner as well as the friction top lid is said to be leakproof and therefore can be used for meats, fruits, vegetables or prepared foods, partially or completely cooked.



Leakproof frozen food container.

"The proof is here

THAT PEOPLE PREFER CELLOPHANE"



Observant retailers know that most people prefer to buy food products in Cellophane. Their cash registers have proved that when manufacturers adopt Cellophane packaging, sales increase.

America's housewives have shown definite preference for this kind of package. It lets them *see* what they buy . . . assures them of sanitary, moistureproof protection. When you use Du Pont Cellophane packaging, you profit by the consumer preference it has earned . . . and you profit by the economy it offers—transparent protection *at low cost!*

The demand for Du Pont Cellophane still exceeds the supply, but we hope the day is now not far off when our converters and ourselves can supply all your requirements.

E. I. du Pont de Nemours & Co. (Inc.), Cellophane Division, Wilmington 98, Delaware.

DU PONT

REG. U.S. PAT. OFF.

Cellophane

Shows what it *Protects*—at *Low Cost*

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

To avoid damage from Oxidation...

protect with NITROGEN

LINDE Nitrogen provides an ideal means of protection against oxidation and corrosion by air. For packaging dehydrated foods; for deaerating, processing, storing and packaging fats and oils of all kinds; or for providing an inert atmosphere, free of impurities, for the complete protection of practically any material susceptible to oxidation, use LINDE Nitrogen.

LINDE Nitrogen is 99.7% pure, but is also available bone dry and at higher purity for special applications. It is supplied as a compressed gas in cylinders containing 244 cu. ft. each, or in bulk in tank-truck and tank-car lots as a liquid which is converted into gaseous nitrogen as required. LINDE Nitrogen in bulk offers remarkable savings in cost and eliminates cylinder handling.

Write or call the Linde office nearest you.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

30 E. 42nd St., New York 17, N. Y. • Offices in Other Principal Cities

The words "Linde" and "Prest-O-Lite" are registered trade-marks.

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Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.
Indianapolis, Ind.
Milwaukee, Wis.
Minneapolis, Minn.
St. Louis, Mo.

Southern States
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Birmingham, Ala.
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Memphis, Tenn.
New Orleans, La.

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Salt Lake City, Utah
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Linde HYDROGEN · NITROGEN · OXYGEN
ARGON · HELIUM · KRYPTON · NEON
XENON — Prest-O-Lite ACETYLENE

CATALOGS, BULLETINS

This selected information on new publications is offered by FOOD INDUSTRIES Readers' Service through cooperation with the manufacturers. It helps executives save valuable time. To obtain literature described, simply fill in form below, clip it to your letterhead and mail to FOOD INDUSTRIES. There is no cost, no obligation.

Food Plant Equipment

Milling Equipment 1

Allis-Chalmers Mfg. Co. has published a catalog summarizing the manifold equipment requirements of milling and processing plants. The bulletin offers help on selecting the proper grinding mill, with a view to easy installation, economical operation and easy maintenance. Various other typical pieces of equipment used in milling, such as reels, and purifiers, are similarly treated.

Valves and Fittings.....2

Cooper Alloy Foundry Co. announces a folder on new procedure of registering stainless steel heat analyses and stamping all castings with corresponding numbers for permanent identification. Certificates indicating these analyses are available, applying to all parts coming in contact with the media handled.

Automatic Clutch 3

Salesbury Motors has released a bulletin describing in detail their automatic clutch. It is designed to operate on loads up to 6 hp. It is said to operate smoothly and easily, absorb momentary overload, eliminate starting shock and arrive quickly at driving speed.

Tanks and Fittings.....4

O. G. Kelley & Co. has prepared a 16-page catalog describing and illustrating wooden tanks of all sizes and shapes, including wood stave water pipe lines, and many of the conventional types of tanks. They have also released a 44-page catalog covering lead equipment, pipes and fittings.

Heat Exchangers 5

The Pfaudler Co. has just released a 42-page booklet, Manual 837, which deals with heat exchangers and condensers. The description and illustrations cover principally four types of exchangers: (1) Fixed tube sheet, nonremovable tube bundle, (2) packed floating head, removable tube bundle, (3) internal floating head, removable tube bundle, and (4) "U" tube or hairpin tube, removable tube bundle. A description of the various standard features, such as dimensions, types of construction, and similar engineering data, is given. Each group type is fully described and illustrated, listing its advantages, limitations and applications. The booklet is replete with line drawings.

Blowers 6

Sutorbilt Corporation has released 4-page leaflet No. 59B describing and illustrating positive pressure blowers, both direct drive and V-belt drive models. A table, listing 20 different gas pumps is shown, with diameter of inlet and outlet, approximate shipping weight, r.p.m. and net capacity in cu. ft. per minute at various speeds and pressures.

Refrigerator Fans 7

Reynolds Electric Co. has issued an 8-page booklet, in color, containing engineering data, flow charts, installation diagrams and other pertinent information about proper air circulation for refrigerators as supplied by their refrigerator fans. For quick visualization, considerable attention is given in this booklet No. 241 to graphic charts showing the proper and improper way to make installations.

Porcelain Pipe and Fittings.....8

Illinois Electric Porcelain Co. has issued an 8-page catalog, No. C-2, which describes and illustrates with photographs and drawings a line of porcelain pipe and fittings suitable for handling food products. They are highly vitrified, non-absorbent and practically indestructible. Spacers, elbows, tees, crosses, reducers and other fittings are shown and tables of various sizes given. Hand wheel valve, check valves are also described and shown.

Multiport Valve 9

Cochrane Corp.'s Booklet No. 4150, deals with multiport safety relief valves. In its 30 pages, illustrations of its numerous applications are found. Of special interest is the revised "Sizing Data on Relief Valves," which include capacity and pressure rise tables very convenient to use for size selection.

Control Equipment

Photoelectric Colorimeter 10

Photovolt Corporation has issued a 15-page bulletin describing a new photoelectric instrument designed especially for water analysis and other tests requiring the accurate measurement of faint colorations and turbidities. The unit is thoroughly described in the text, which is illustrated by means of drawings. In addition, a detailed discussion of the principle and the procedure involved is given.

Instruments 11

The Foxboro Co., Foxboro, has issued Catalog No. 370, presenting the company's full line of recording and indicating instruments for measurement and control. It is arranged for quick reference and is profusely illustrated. The various sections deal with temperature applications, pressure, humidity, flow, liquid level, density and other process variables.

Rotameters 12

A 34-page brochure on rotameters has just been released by Schutte & Koerting Co. The construction, the principal applications and advantages of the various types of rotameters they manufacture, are fully described and illustrated. Parts of a typical rotameter are shown in sketches and photographs. Instructions for installing, cleaning and piping arrangements are given.

Helicoid Gage 13

Complete technical data on pressure gages is given in 14-page bulletin, No. 400, published by American Chain and Cable Co., Inc. The company states that helicoid gages are guaranteed accurate to within ½ of 1 percent of the total dial graduation over the upper 95 percent of the 280 deg. dial arc. Cut-

Good until August, 1946

FOOD INDUSTRIES READERS' SERVICE

FOOD INDUSTRIES, 330 W. 42nd St., New York City 18

Please have manufacturer send me, without obligation, literature circled below.

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16 17 18 19 20 21 22 23 24 25 26 27

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6-46

FOR CONTINUOUS PRODUCTION

Modern Food Processors "PASS the SALT" BY LIXATOR

The Lixate Rock Salt Dissolver will help keep production on a continuous basis in your plant by providing crystal clear brine *at the turn of a valve,* whenever and wherever needed.

Salt is handled only once—from nearby storage to the Lixator. Control of brine production, salt feed, water input, and brine discharge are *completely automatic*. There are no production interruptions while handling salt and making brine.

Lixate Brine contributes to the efficient operation of modern food plants of all kinds. Meat, vegetable, fish and other food processors find the quality of Lixate Brine eminently satisfactory for the curing, flavoring, pickling and preserving of different foods.

The Lixate Rock Salt Dissolver comes in a variety of sizes, to meet any needed brine requirement.

Get the full story. Learn how others have boosted efficiency, cut costs. It's the way to continuous production. Write today for "The Lixate Process for Making Brine."

INTERNATIONAL SALT COMPANY, INC., Dept. FI-6, Scranton, Pa.

*Name*_____

*Firm*_____

*Street*_____

*City*_____ *State*_____

The LIXATE *Process* FOR MAKING BRINE

★ ★ ★

INTERNATIONAL SALT COMPANY, INC.
Scranton, Pa.

away photographs and line drawings show the complete line of helicoid gages and how they work, what goes into them, how they are put together, and explains why they are so accurate.

Counting Devices 14

Machine time, production output and conveyor loads can all be recorded with devices shown in Form 50, an 8-page announcement on counters from Electropet, Inc.

Materials Handling Equipment

Single-Stage Pump 15

Ingersoll-Rand Co. announces the publication of a 20-page two-color catalog covering the design, construction and engineering details of its Cameron single-stage general service pumps. A number of pages of this bulletin show typical installations, several others give cross-sections and interior views; another presents the various types of drives available.

Overhead Conveyor 16

A well-illustrated 20-page bulletin, showing actual installations of overhead conveyors, has been issued by Lamson Corp. In addition to the illustrations, there are four plant sketches showing how the overhead conveyors interlock to produce a smooth flow to all operations. Each photograph is accompanied by detailed descriptive text.

Conveyor Belts 17

B. F. Goodrich Co. has issued a leaflet entitled, "Guide to the Selection of Conveyor Belt Grades." The publication discusses differences in various grades, outlines the reliable measurements of qualities in various type belts and the services for which they are commonly applied.

Plant Supplies

Printing Inks 18

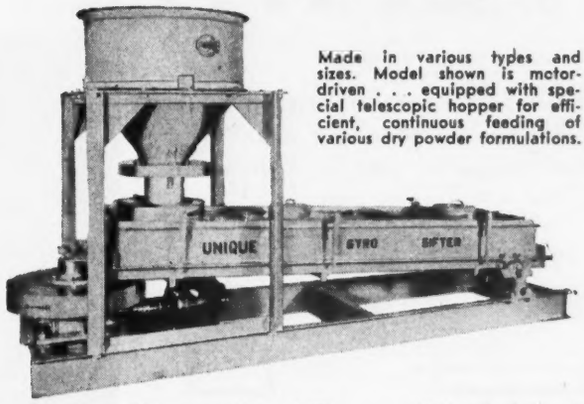
General Printing Ink Co. has released a 16-page bulletin describing a new type of printing ink called "Hydry." The booklet describes how this ink differs from the four conventional types. Its principal properties are that it does not oxidize nor does it require evaporation of solvents to harden. The bulletin gives the theory involved in the immediate hardening of the outer film surface and shows how the theory is applied in the new ink.

Stencil Duplicator 19

The Multistamp Co. has published a 6-page bulletin describing various combination outfits of stencil duplicator sets called "Multistamp." It tells how it can be used to stencil shipping tags, labels, cards, wood, cloth, cardboard or paper. It also describes the procedure by which you can either type or draw on a stencil, which is supplied, mount it on a frame, ink it and then use it

ROBINSON
PROCESSING UNIQUE EQUIPMENT

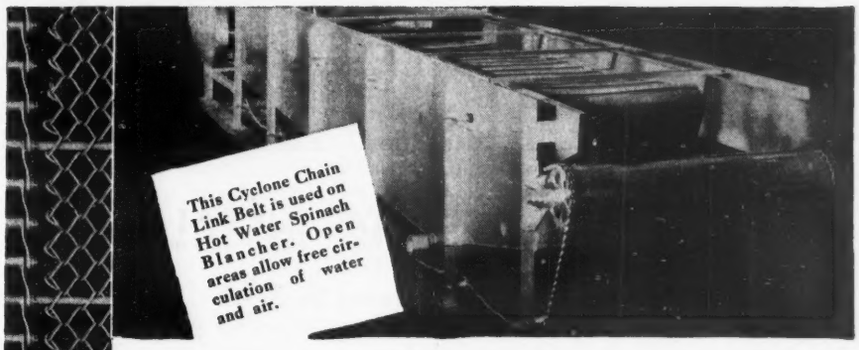
GYRO-SIFTERS



Made in various types and sizes. Model shown is motor-driven . . . equipped with special telescopic hopper for efficient, continuous feeding of various dry powder formulations.

Crushers, Grinders, Sifters, Attrition Mills . . . Material Processing Machinery of every type. Designed to your requirements by experienced engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

ROBINSON MANUFACTURING CO.
Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.



Need conveyor belts?
CYCLONE offers three types!

CYCLONE Metal Conveyor Belts are made in *three* types: Chain Link, Flat Wire and Flex-Grid. Our salesmen, engineers and metallurgists are thoroughly qualified to help you decide which type of belt will work best for you . . . which metal, alloy or finish will best meet *your operating conditions.* Cyclone's enviable reputation for quality is backed by 25 years' experience in making metal conveyor belts—your assurance of a dependable product. Consult Cyclone about your conveyor belt problems. Offices in principal cities . . . factories in Middle West and on Pacific Coast. Write for *free* catalog No. 3.

CYCLONE FENCE DIVISION · American Steel & Wire Co. · USS CYCLONE Reg. U.S. Pat. Off. METAL BELTS · UNITED STATES STEEL

By the makers of Cyclone Fence
CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
Dept H-66, Waukegan, Illinois
United States Steel Export Company, New York

UNITED STATES STEEL

STEAM

when you want it

-at minimum cost!

A Cyclotherm may be installed anywhere —functions without foundation, pitting or stack. Note favorable "go-thru" dimensions.

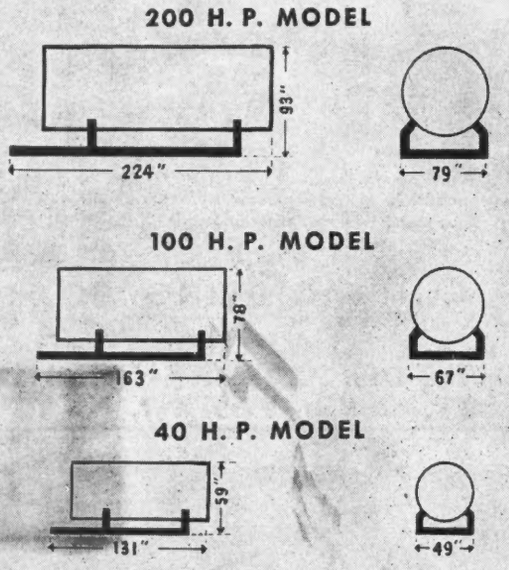


Illustration - 40 HP Model equipped with combination oil and gas burner.

COSTS LESS TO INSTALL — LESS TO OPERATE

Cyclotherm Steam Generators are designed for operation with modern fuels to meet modern steam problems! They are low in initial cost and may be installed easily, speedily and economically.

Quick Steaming—High Efficiency

Exclusive Cyclotherm engineering features give you very quick steaming, combined with adequate steam capacity so that heavy, peak loads may be satisfied without pressure drop. The operating efficiency of Cyclotherm units will be not less than 80%. All Cyclotherm units may be fired with light oil or gas; heavy oil operation in sizes from 50 to 200 HP. Units may also be equipped with a combination oil-gas burner that permits quick change-over from one fuel to the other by merely throwing a switch.

Automatic Controls—Wide Range Modulation

All Cyclotherm units are fully automatic in their operation and require only the minimum of attention and maintenance. Units from 50 to 200 HP are equipped with wide range modulating controls that fire the unit from 30 to 100% of capacity in response to steam demand—Cyclotherm efficiency remains at the same high rate throughout the range of modulation, and steam pressures are maintained on an even level.

Cyclotherm units come in sizes from 5 to 200 HP and in pressures from 15 to 200 psi. They are shipped complete with boiler, burner, all controls and accessories assembled—fully piped, wired, test fired for performance and ready to operate on arrival.

Write, wire or phone for more complete information.

CYCLOTHERM STEAM GENERATORS

CYCLOTHERM CORPORATION, 90 BROAD STREET, BOX 801, NEW YORK 4, N. Y.

like a rubber stamp. Units can be obtained in various sizes all using the same principle.

Reflectors 20

"Plastics for Light Conditioning," is the name of a 12-page booklet issued by General Electric Company. It describes the uses of plastics for reflectors and shades. The illustrated booklet lists all models now available, with the characteristics of each type.

Water Softener 21

Benefits and economies of soft water are presented in Bulletin 607, released by Elgin Softener Corp. It describes water softeners and other zeolite water conditioning equipment. Of special interest is the description of their newest design, which in comparison to water softeners of conventional design is said to accommodate as much as 44 percent more water softener zeolite. One section of the bulletin tells how to modernize existing water softeners.

Miscellaneous

Fire Fighting Equipment.....22

Use of mechanical foam, formed without chemical reaction, is explained in a 16-page booklet published by Pyrene Manufacturing Co. with the title "Air Foam." The nature and advantages of air foam are presented. Action photographs show foam equipment in use.

Construction Engineers 23

Economical planning is emphasized by Mutual Construction Corp., engineers and contractors, in a release "Construction Facilities Available," which lists recent building projects. This firm has handled emergency housing undertakings.

Public Relations 24

Publicity technic for the smaller company is the subject of the third of a series of booklets on public relations problems from the Electrical Manufacturers Public Information Center.

Consultants 25

"Microchemical Services" is the title of a folder from the micro-analytical laboratory of Foster D. Snell, Inc.

Tools and Fixtures.....26

Precision Equipment Co. has issued a new seasonal 36-page catalog of tools and fixtures useful in the plant, office and laboratory.

Bakery Service 27

"At Your Service" is the name of a new 100-page booklet put out by Procter & Gamble, Cincinnati, Ohio. It is intended for the baking industry and is replete with illustrations. Numerous formulas are given to show how scarce ingredients can be stretched in the manufacture of cakes, icings, sweet doughs, cookies, pies and so forth. A section describes how power equipment and labor may be conserved.

protect yours fully by means of SCHWARZ SCIENTIFIC TESTING AND CONTROL

With familiar brands of foods and beverages now back on store shelves, in quantity, your label—and particularly its claims—assumes an added significance.

To regain, and hold, acceptance of your product, both your label and advertising claims *must* remain valid from the time processing is completed until the food is ultimately consumed—a responsibility which Schwarz Laboratories, Inc., has shared with many leading food and beverage manufacturers.

Toward this end, Schwarz offers a variety of services including:

Analysis of samples — at all stages of processing.

Establishment of routine testing procedures in your plant.

Recommendations as to manufacturing procedure and maintenance of sanitary conditions—plus many other services.

Write now for the new, 20-page Schwarz Bulletin *"Scientific Quality Control of Foods and Beverages"* prepared for food and beverage plant executives, chemists and engineers.

Schwarz LABORATORIES, INC.

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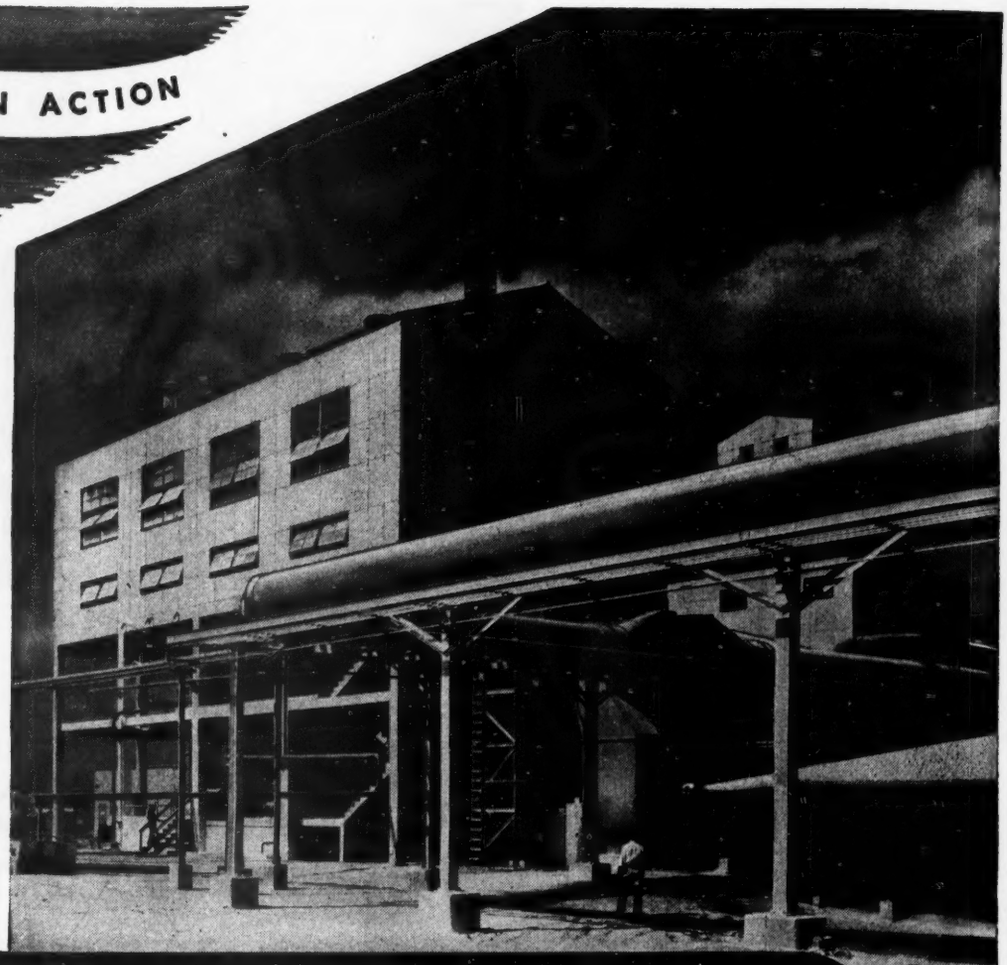

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

VITAMINS

Carotene Loss

THE problem of carotene retention in vegetable leaf meals is one of preventing oxidation of a highly unsaturated and therefore relatively unstable compound. Storage temperature and oxalic acid content are the primary factors.

Leaves of beet, carrot, broccoli, lima bean, rhubarb, spinach and sweet corn were dried to a moisture content of 5 percent, ground, and stored at 41, 75, and 100 deg. F. Carotene concentrates were prepared from a mixture of the leaf meals. Of the three temperatures used, the greatest carotene stability was at 41 deg. F. and the least at 100 deg. F. Retention varied with species of leaf, and a high oxalic acid content seemed to be favorable. Concentrates dissolved in oils are more stable than crystalline carotene in the same oils, possibly due to tocopherol in the concentrate. Levels of carotene up to 1,000 micrograms per gram are more stable than the 5,000 and 15,000 microgram levels. Oil solutions are more stable at 41 deg. F. than at higher temperatures. Addition of d-isoascorbyl palmitate and soybean lecithin to the solution is ineffective in reducing loss of carotene. Charts are given in this article to show the effect of storage temperatures and blanching on carotene retention in dry vegetable leaf meals, effect of temperature on stability of concentrate in oils, effect of concentration on retention in oils at 41 deg. F., effect of source on retention in oils.

Digest from "Carotene Loss in Stored Leaf Meals and Extracts," by M. E Wall and E. G. Kelley, *Industrial and Engineering Chemistry*, vol. 38, 215-218, February, 1946.

FATS and OILS

Non-break Soybean Oil

WHEN oils, such as soybean, are heated, a dark colored precipitate, known as "break," is formed. To produce a non-break oil a wet alkali refining is customarily employed, and the reaction mixture is allowed to stand to permit settling of the sludge. Soap is formed, and since water is present, there is a problem of emulsification of some oil with a resulting loss of oil.

It is the object of a recent patent to produce a light-colored, non-break oil by first treating the oil with an acid clay having a pH less than 5, removing the clay, adding water to emulsify the phosphatides, and separating the emulsion by centrifuging. Fuller's earth, with a pH greater than 8, is added to the oil. After a period of 10 minutes at a temperature of 220 to 240 deg. F. the oil is filtered.

It is claimed that by this method a soybean oil which is non-break at 600 deg. F. can be produced.

Digest from U. S. Patent 2,392,390, issued January 8, 1946, on an application dated July 15, 1942, to P. L. Julian and H. T. Iveson, and assigned to The Glidden Co., Cleveland, Ohio.

MEATS

Vitamin Retention In Processed Meats

PORK luncheon meat, processed at 235 deg. F. in 12-oz. and 2½-lb. cans, was stored at 45, 70 and 98 deg. F. for 12 months. At three-month intervals the cans were sampled and assayed for thiamin, niacin, riboflavin and pantothenic acid. Color, flavor and texture were also examined at the same intervals.

The heat treatment given the meat reduced the thiamin content from 565 mg. per 100 g. to 300 to 440 mg. During storage, losses at 45 deg. F. were entirely negligible. At 98 deg. F. 0-50 mg. remained after a year. At 70 deg. F. about two-thirds of the thiamin was retained. Color, flavor, and texture changes correlated with the thiamin losses, storage at 45 deg. F. giving best quality. Pork luncheon meat should be stored below 70 deg. F. if long storage periods are necessary.

Riboflavin was not appreciably affected by either processing or storage, but kept its initial value of 210 mg. per 100 g. throughout the test. Niacin and pantothenic acid were reduced from 4.0 to 810 mg. per 100 g. to 3.17 to 3.70 mg. and 510 to 580 mg., respectively, by the heat-processing treatment. Thereafter, they underwent no further change at any temperature during the 12 months storage period.

Digest from "Vitamin Retention in Processed Meat," by J. F. Feaster, J. M. Jackson, D. A. Greenwood and H. R. Kraybill, *Industrial and Engineering Chemistry*, vol. 38, 87-90, January. 1946.

RAW MATERIALS

Potato Yields

POTATO yields are affected by the size of the whole or cut seeds and by the seed spacings. Studies made at Presque Isle, Maine, over a three year period, with whole seed potatoes of the following sizes: 1 to 1¼ in., 1¼ to 1½ in., 1½ to 1 11/16 in., and 1 11/16 to 1⅞ in., and cut seed consisting of large seconds (tubers 1 11/16 to 1⅞ in. cut into halves), 1-, 1½ and 2-oz. pieces cut from 1⅞ to 2½ in. tubers, showed consistent increases in yield with increasing size of whole and cut seed used. Increases in yield were sufficient to more than pay for the extra cost of seed and harvesting. As the size of the seed was increased, the number of stalks and number of tubers per hill increased. A part of the increase in yield, however, was in the production of smaller than 1⅞-in. tubers. The use of large seed would appear to be more profitable to a seed grower than to a table stock grower.

Effect of seed spacing was likewise studied. Three spacings, 6, 9 and 12 in., were used. Total yields increased as seed spacing was decreased. Average size of tubers decreased as spacing was decreased. Data suggests that a seed grower could profitably use a 6-in. spacing but that a table grower should use a spacing of not less than 9 in.

Digest from "Size of Whole and Cut Seed and Spacing in Relation to Potato Yields," by J. A. Chucka, A. Hawkins, B. E. Brown and F. H. Steinmetz, *Maine Agricultural Experiment Station* Bulletin 439, December, 1945.

ASSAY METHODS

New Assay for Vitamin C

OXIDIZABLE property of ascorbic acid is used in one of the most accurate methods of assay that permits the ascorbic acid to be titrated with standard iodine solutions. Unfortunately this method has not been of much practical value for the analysis of natural products and enriched pharmaceuticals because of their highly colored nature. The method studied by the authors obviates the color interferences and permits the use of iodine titration methods in all instances. The method makes use of

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a modern vacuum tube voltmeter. With a pair of polarized platinum electrodes, immersed in the solution to be tested, and connected to the vacuum tube voltmeter, the iodine solution is gradually added to a known amount of the sample being tested. At the equivalent point the indicator tube opens immediately and completely. From the quantity of iodine solution used and the amount of sample taken, the percent of vitamin C present may be easily calculated.

Digest from "Iodimetric Titrimetric Determination of Vitamin C," by Jane Adams, M. M. Acker and H. A. Frediani, read before the Division of Analytical and Micro Chemistry of the American Chemical Society at Atlantic City, N. J., April 9, 1946.

STORAGE

Storage of Dried Fruits

MOISTURE and sulphur dioxide affect the color and keeping qualities of dried fruits stored at high temperatures. Palatability tests and color comparisons were used to determine their effects upon the keeping qualities of dried apricots.

Under anaerobic conditions it was found that storage life was increased by high moisture contents. The effect was reduced as the oxygen content increased until at 100 mg. oxygen per 100 g. of fruit storage life was reduced. Very low moisture retards darkening.

Storage life is proportional to the sulphur dioxide content in the range 1,500 to 8,000 ppm. Amounts up to 25,000 ppm. are also effective but with a declining rate of increase in shelf life. It retards darkening only, and dried apricots will deteriorate to the point of inedibility at levels as high as 5,000 ppm. SO_2. Palatability tests indicate that 6,500 ppm. SO_2 prior to cooking is not objectionable to most people.

Digest from "Storage of Dried Fruit. Influence of Moisture and Sulfur Dioxide on Deterioration of Apricots," by E. R. Stadtman, H. A. Barker, E. M. Mvak and G. MacKinney, *Industrial and Engineering Chemistry*, vol. 38, 99-104, January, 1946.

Color Changes in Eggs

COLOR changes in eggs during cold storage are due to diffusion of iron from the yolk to the white. Concurrently, there is a diffusion of egg white into the yolk.

When hens were fed cottonseed meal or cottonseed oil, their eggs showed discoloration after a few months in cold storage. Spectrographic analysis showed that discoloration was not caused by a modification or diffusion of the normal pigments of egg white or yolk. Addi-

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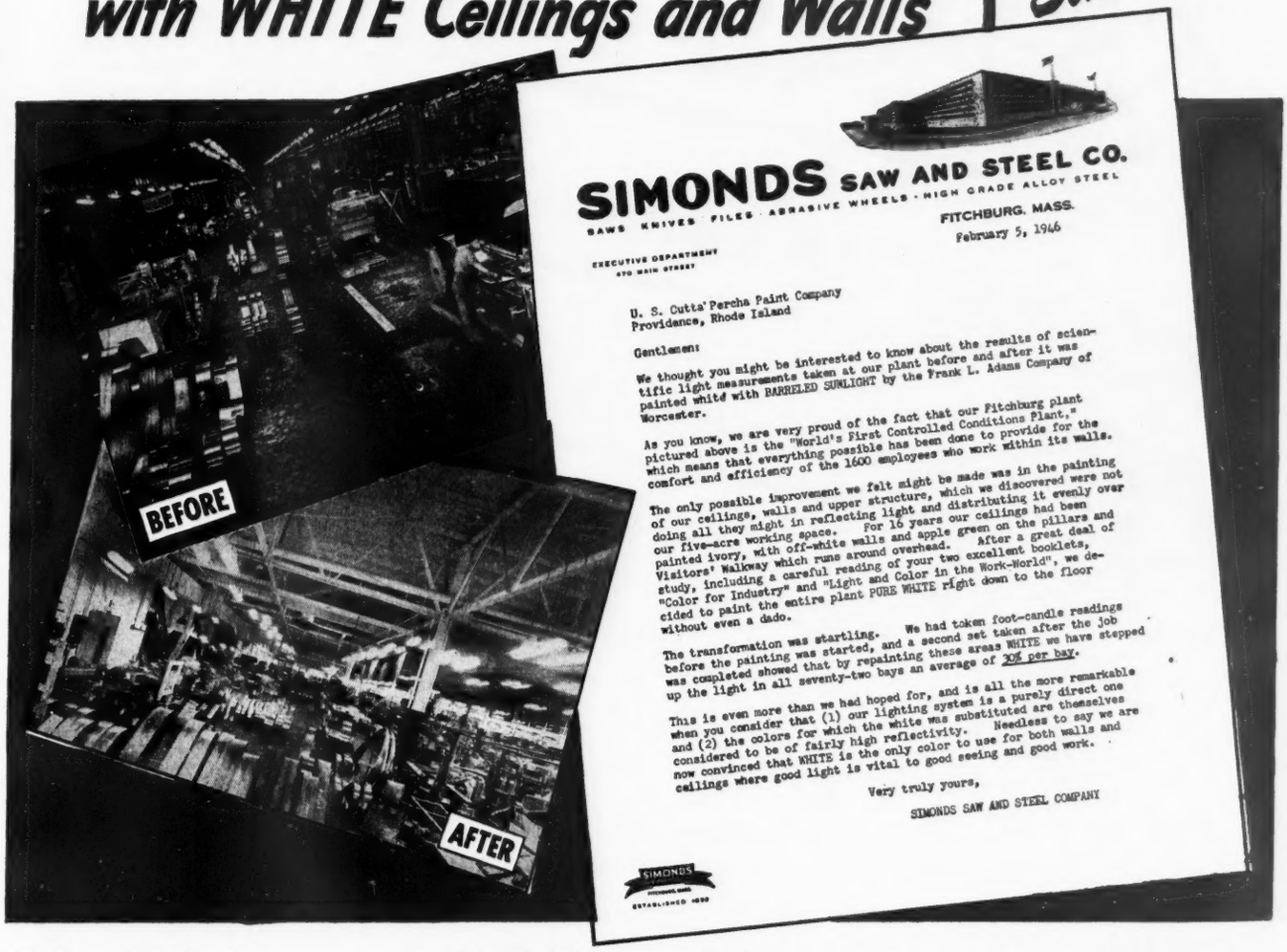
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February 5, 1946
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Gentlemen:
We thought you might be interested to know about the results of scientific light measurements taken at our plant before and after it was painted white with BARRELED SUNLIGHT by the Frank L. Adams Company of Worcester.
As you know, we are very proud of the fact that our Fitchburg plant pictured above is the "World's First Controlled Conditions Plant," which means that everything possible has been done to provide for the comfort and efficiency of the 1600 employees who work within its walls.
The only possible improvement we felt might be made was in the painting of our ceilings, walls and upper structure, which we discovered were not doing all they might in reflecting light and distributing it evenly over our five-acre working space. For 16 years our ceilings had been painted ivory, with off-white walls and apple green on the pillars and Visitors' Walkway which runs around overhead. After a great deal of study, including a careful reading of your two excellent booklets, "Color for Industry" and "Light and Color in the Work-World", we decided to paint the entire plant PURE WHITE right down to the floor without even a dado.
The transformation was startling. We had taken foot-candle readings before the painting was started, and a second set taken after the job was completed showed that by repainting these areas WHITE we have stepped up the light in all seventy-two bays an average of 30% per bay.
This is even more than we had hoped for, and is all the more remarkable when you consider that (1) our lighting system is a purely direct one and (2) the colors for which the white was substituted are themselves considered to be of fairly high reflectivity. Needless to say we are now convinced that WHITE is the only color to use for both walls and ceilings where good light is vital to good seeing and good work.
Very truly yours,
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Light meter check proves superiority of white paint for ceilings and walls in working areas

A CONVINCING DEMONSTRATION of what WHITE paint on plant ceilings and walls can do to increase light and improve seeing conditions is described in the above letter from Simonds Saw and Steel Company.

The light measurements referred to were made by Simonds' own engineers. They proved *conclusively* that by repainting in WHITE the areas which for sixteen years had been painted in color, they had increased the light 30% as well as greatly improving its quality.

Unless *your* plant is the 1-in-100 which has enough light for easy, accurate seeing, it will pay you to take advantage of Simonds' experience. For full details on the relationship between Light, Paint and Seeing, send for a free copy of "Color for Industry". To get your copy, just fill out and mail us the coupon below TODAY.

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tion of iron to egg white in the amount found in yolk produced a pink color. Consequently, discoloration of whites of stored eggs is attributed to diffusion of iron from the yolks into the whites and its reaction with conalbumin. The salmon color of yolks of stored eggs is attributed to the diffusion of conalbumin into the yolks, its reaction with the iron to produce a pink color, and a blending of this color with the yellow of normal yolks.

Digest from "Color Changes in Eggs During Cold Storage," by P. J. Schaible and S. L. Bandemer, presented before the Division of Agricultural and Food Chemistry of the American Chemical Society at Atlantic City, N. J., April 10, 1946.

DAIRY

Irradiation of Milk

AN experimental plant for the vitamin-D enrichment of milk by ultraviolet light is in operation in Germany. The plant consists of a 7x2 ft. cylinder of aluminum sheet, housing a spiral made from 330 ft. of quartz tubing, .39 in. inside diameter. The entire cylinder is flooded with ultraviolet light from 8 straight tubes. Capacity of the plant is 100 gal. per hour. It is claimed that besides increasing the vitamin-D content of the milk, pasteurization at room temperature also takes place.

Digest from "Dairying in Germany," by H. M. Langton, *Food* (London), vol. 15, 175, 91-92, April, 1946.

Bacteria, Fat and Vitamins In Goats Milk

GOAT'S MILK contains fewer bacteria and less riboflavin, but about the same amount of fat and ascorbic acid as cow's milk. Thirty-nine samples of goat's milk were obtained from localities throughout Massachusetts and arrived at the Agricultural Experiment Station laboratory at temperatures ranging from 34 to 40 deg. F. Sixty percent of the samples represented a single milking of one animal. The other samples were composites of milk from herds of 8, 19, 50 and 65 goats. Four breeds were represented; their ages varied from one to 12 years and the stages of lactation from 10 days to 36 months. The majority were stall-fed, but 14 of the samples were from goats that also received herbage varying from buds and twigs of bushes, to clover, timothy, and red top pasture.

The average bacteria count of the milk was 3,500 per cc., the average fat content 4.3 percent. Reduced ascorbic acid from stall-fed goats averaged 15.1 mg. and from those re-

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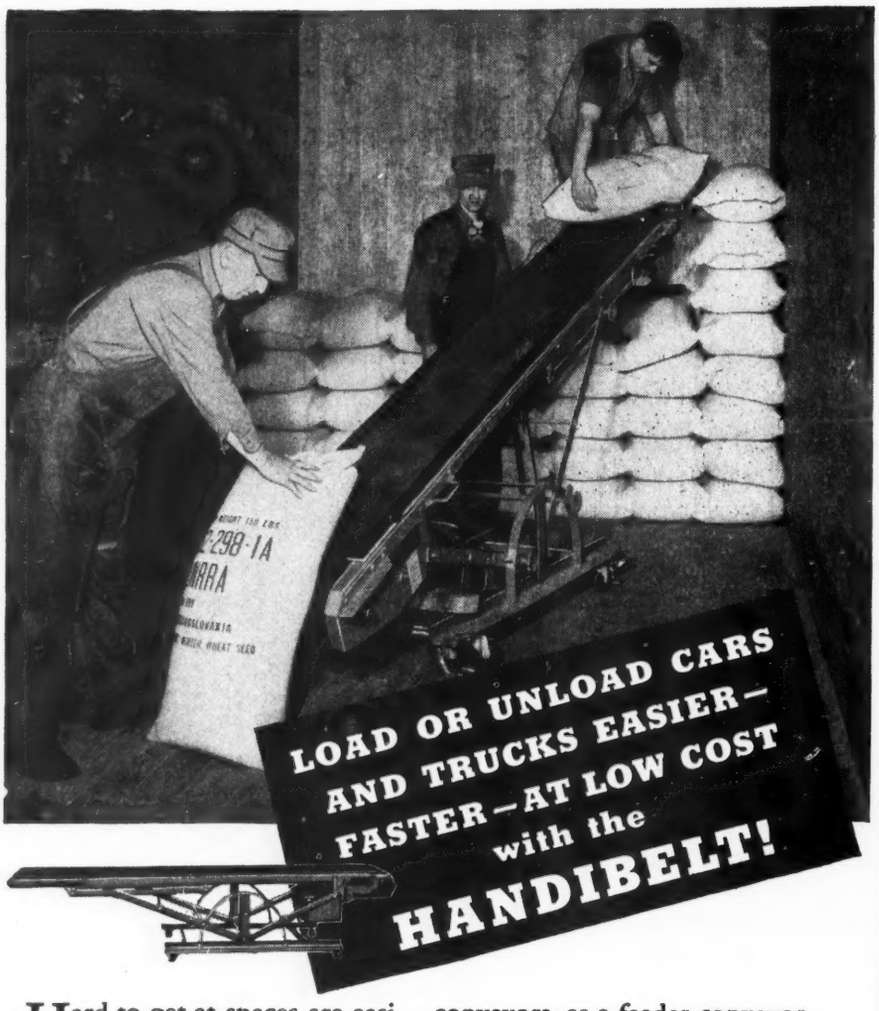

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ceiving pasture 20.0 mg. per liter. The riboflavin content of the milk from stall-fed goats averaged 1.24 mg. and from those receiving pasture 1.02 mg. per liter.

Digest from "The Variation in the Bacteria, Fat, Ascorbic Acid, and Riboflavin Content of Goat's Milk," by A. D. Holmes, H. G. Lindquist, and E. K. Greenwood, *Massachusetts Experiment Station Bulletin* 428, 27, October, 1945.

MICROBIOLOGY

Salmonella in Dried Eggs

SALMONELLA organisms have been reported in dried eggs. Though no serious health hazards have been attributed to this source, dangerous species have been found in duck, pigeon, and turkey eggs. In the work reported here 2,400 hens' eggs were examined for the presence of *Salmonella* types; 1,000 from a flock of 55 known *Salmonella pullorum* reactors were examined as to contents, and 400 from the same flock for *Salmonella* types on the shell, as well as 1,000 eggs from normal birds. Selective media were used and organisms were classified as *Salmonella* when they satisfied the criteria of Gibbons and Moore.

The contents of the 1,000 eggs from the *pullorum* reacting flock showed 61 of them infected with *Salmonella pullorum*. No *Salmonella* organisms were obtained from the 400 diseased shells, nor from the contents of the 1,000 eggs from normal birds. While the data indicate that hens' eggs are unlikely to be infected with *Salmonella* organisms other than *S. Pullorum*, further studies should be made towards the manner in which other *Salmonella* species affect laying hens.

Digest from "The Occurrence and Distribution of *Salmonella* Types in Fowl. I. Isolation from Hens' Eggs," by F. E. Chase and M. L. Wright, *Canadian Journal of Research*, vol. 24F, 77-80, January, 1946.

FISH

Control of Rancidity In Stored Fish

THE ONSET of rancidity in flesh of fatty fish can be almost entirely prevented if the fish are stored in the frozen state in the presence of a very high concentration of CO_2 or nitrogen gas.

Tests were made at the Pacific Fisheries Experimental Station with fillets of fresh herring, red spring salmon, coho salmon, pink salmon and lemon sole. Half of the fillets from each fish were wrapped individually in M.S.T. cellophane and the

(*Turn to page* 206)

a 10% dividend of happiness to the prime of life"

THE STATEMENT above was made by one of the country's leading authorities on nutrition.

Nutritionists, in recent years, have devoted a great amount of study to *older age* nutrition. More studies are now in progress.

Commenting on these studies, a well-known publication says: "Gradually there has begun to crystallize in medical minds an exciting thought: that maybe the chronic symptoms of age aren't age at all, but instead are the result of long-continued deficiency in diet."

The same publication continues: ". . . to prolong the usefulness of middle years, man must be taught proper eating habits during babyhood and must stick to them thruout youth and maturing years."

We have quoted these statements at length because we believe they will be of interest to food companies —particularly to those companies which may be planning specialized vitamin-fortified products for older age groups.

Standard Brands Incorporated has spent much time and research in recent years developing products for Vitamin B complex, Vitamin D and protein supplementation of foods. These products are known for their dependability and uniformity.

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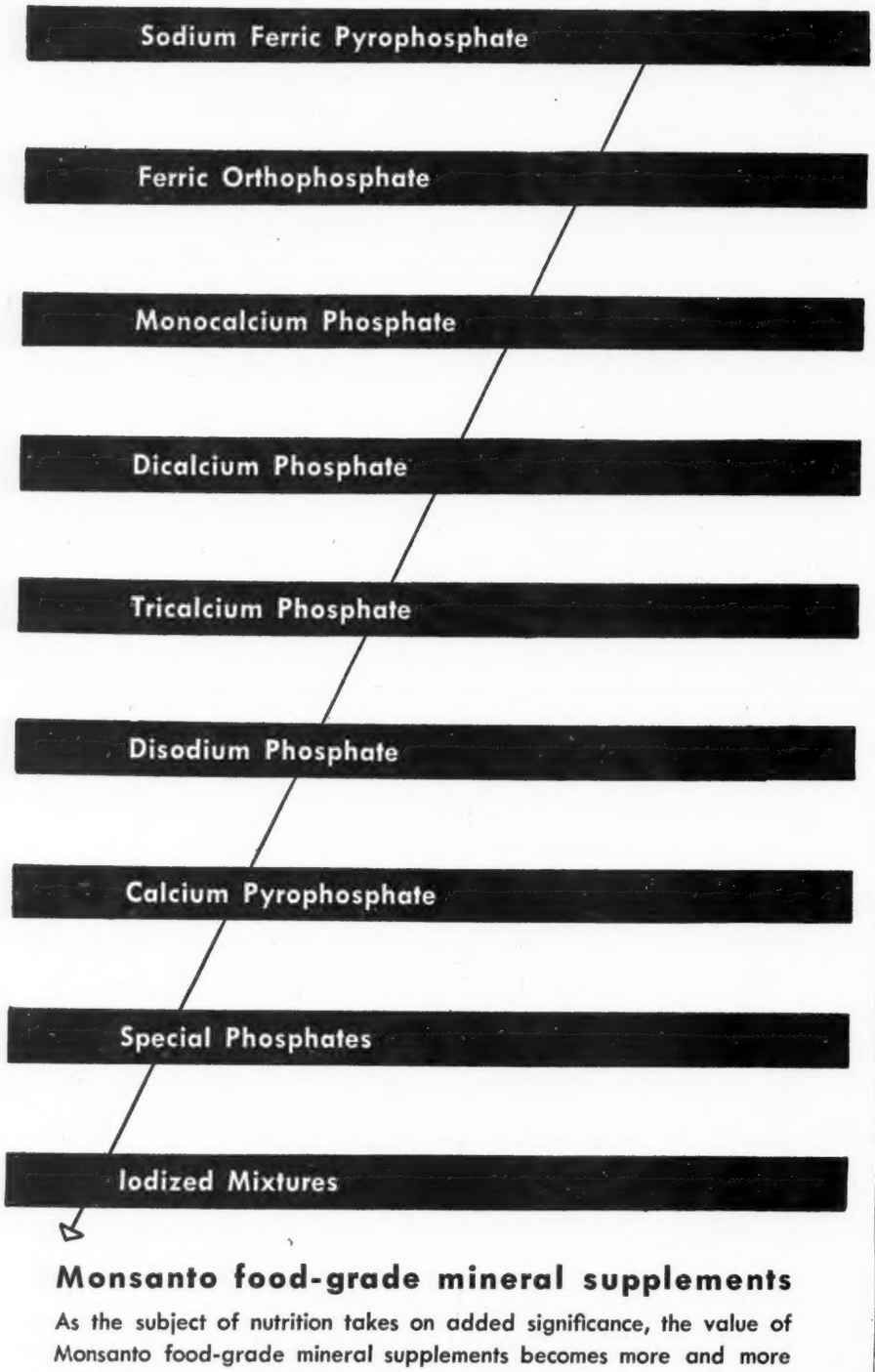

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remainder lightly brined and drained before wrapping. They were packed into waxed fillet cartons, frozen and stored overnight at –25 deg. F., then subjected to the following treatments: (1) Controls were stored in air, (2) cartons stored in a pressure cooker, in which all but 0.1 percent of the air was replaced with CO_2, (3) same as (2) except that nitrogen gas was used instead of CO_2, (4) cartons placed in a container similar to (2) and a steady stream of CO_2 flushed through it for 30 minutes before sealing. Treatments were carried out at 14 deg. F. and containers stored at this temperature.

After 40 days' storage, peroxide values for the air-stored fillets were considerably higher than at the beginning of the experiment. The fillets that were vacuum treated and stored in CO_2 or nitrogen gas showed no increase in peroxide values, but in those flushed with CO_2 there was a noticeable increase, indicating that sufficient oxygen remained in the packages to cause fat oxidation.

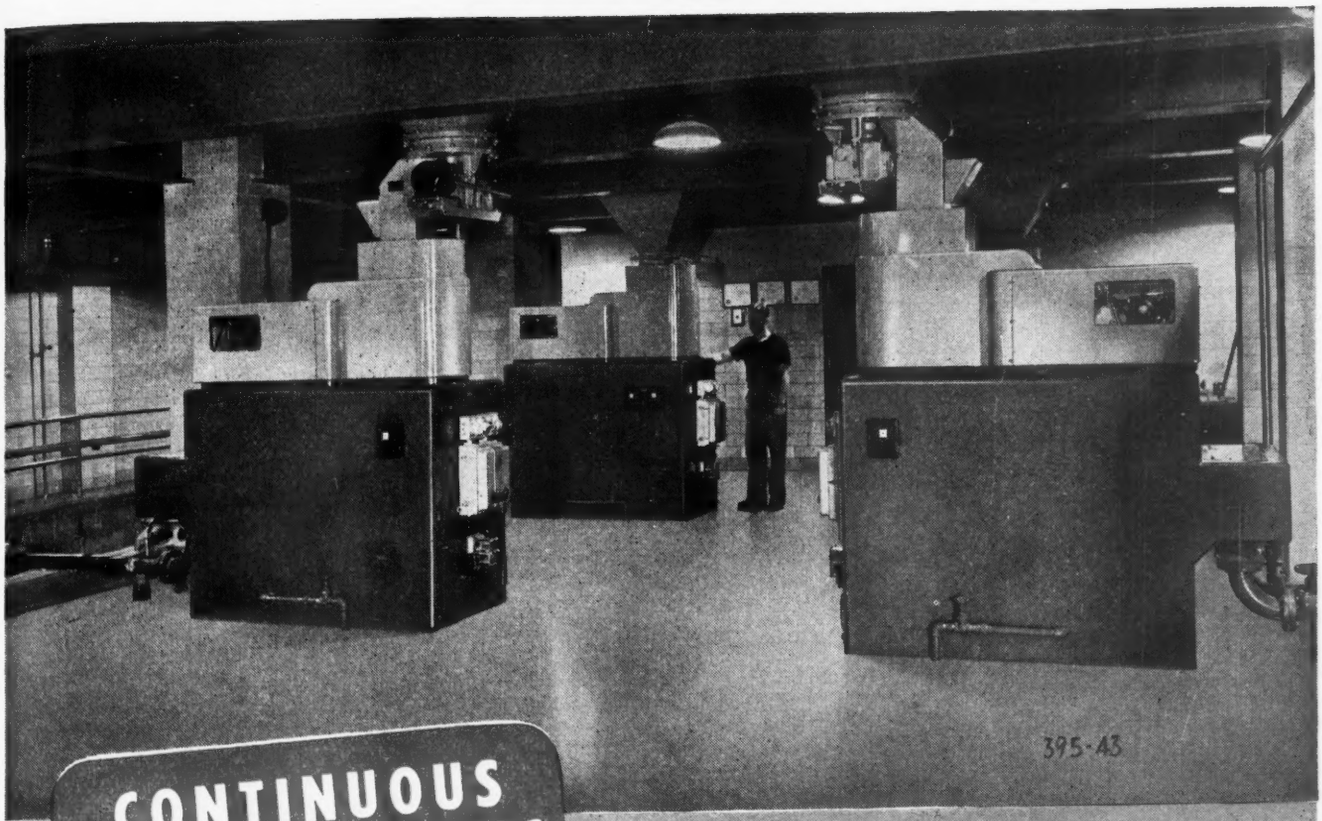
Digest from "Control of Rancidity in Stored Fish. II," by H. L. A. Tarr, Progress Reports of the Pacific Coast Stations, Vancouver, B. C. No. 66, March, 1946.

BAKING

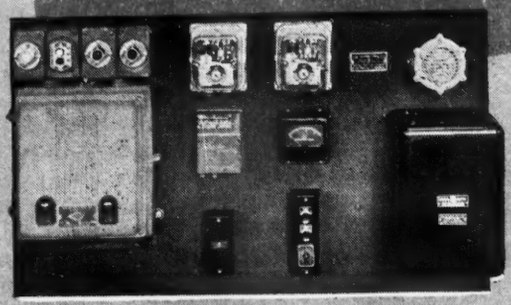
Soy Flour in Baking

EXCELLENT bread may be made from wheat-soy flour blends including up to 8 percent soy flour by the use of from 3 to 5 times the quantities of potassium bromate needed for wheat flour alone. Baking studies were carried out in the Federal Soft Wheat Laboratory at Wooster, Ohio, using a commercially milled and bleached hard red spring wheat flour containing 15 percent protein, with various increments up to 8 percent of each of three different soy flours. Amounts of potassium bromate up to 8 mg. per 100 g. of flour were used. Absorption and mixing time were varied and bakings were made with and without 4 percent milk solids. Quality of the bread, as measured by loaf volume and crumb grain, was even better than for wheat flour alone provided the quantity of potassium bromate used in the baking formula was increased according to the amount of soy flour used. Absorption and mixing time increased with the amount of soy flour used.

A hexane-extracted flour buffered the effect of excess potassium bromate fully as effectively as nonfat milk solids. Crumb color of the bread became progressively more cream-gray with increased amounts of soy



CONTINUOUS PROPORTIONING *by* REMOTE CONTROL



This group of Jeffrey-Traylor Waytrols automatically proportions various ingredients. Such equipment is adaptable to most kinds of materials.

The remote control panel board has an automatic alarm, klaxon, tonnage indicator and push buttons to increase or decrease capacity.

If desired, tonnage indicator can be equipped to furnish a printed weight record.

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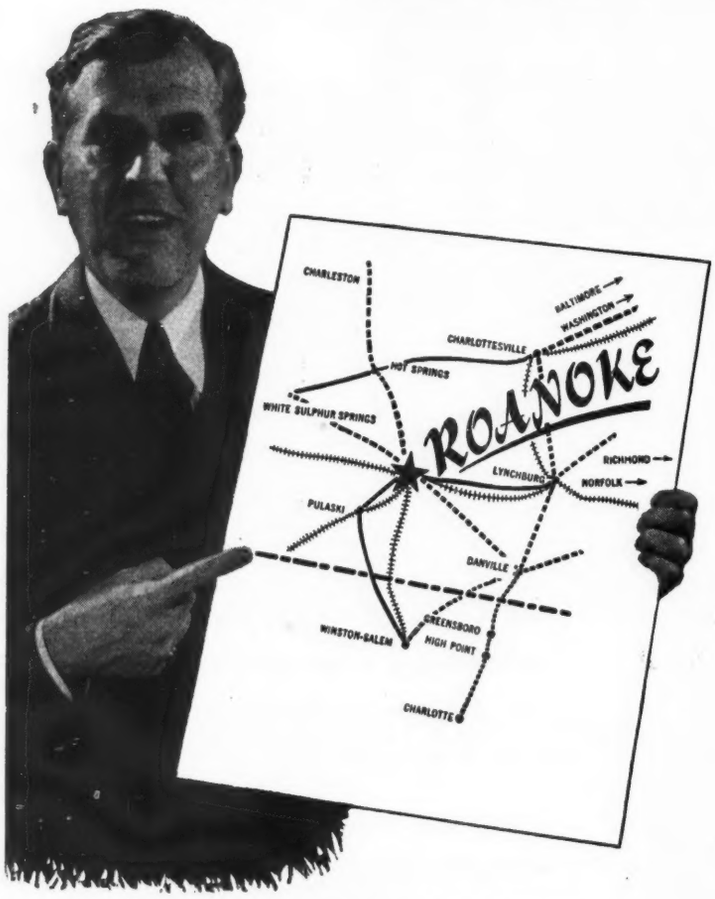
A NATURAL

BY THE MAP!



Strategically centered between producer and consumer . . . on the main line of the Norfolk & Western and Virginian railroads . . together with arterial highways . . . ROANOKE is ideally located to cold storage your perishable foods. 1,000,000 cubic feet of modern cooler and freezer space with complete financial protection. For ready access to your markets . . . plus rapid handling to insure speedy distribution . . . . . choose ROANOKE. Icing facilities available. Write for illustrated folder.

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ROANOKE, VIRGINIA

flour. Color change produced by adding as much as 4 percent soy flour probably would not be noticed by most consumers.

Digest from "Loaf Volume Potentialities, Buffering Capacity, and Other Baking Properties of Soy Flour in Blends with Spring Wheat Flour," K. F. Finney, *Cereal Chemistry*, vol. 23, January, 1946.

DEHYDRATION

Drying Whole Milk

POWDERED whole milk having markedly improved keeping qualities and freedom from oxidation is the subject of a recent invention.

The patented process consists of separating milk into skim milk and cream, condensing the skim milk, heating both portions to 170 to 180 deg. F. for 15 to 30 minutes, recombining the heat-treated portions and drying the mixture to a powder.

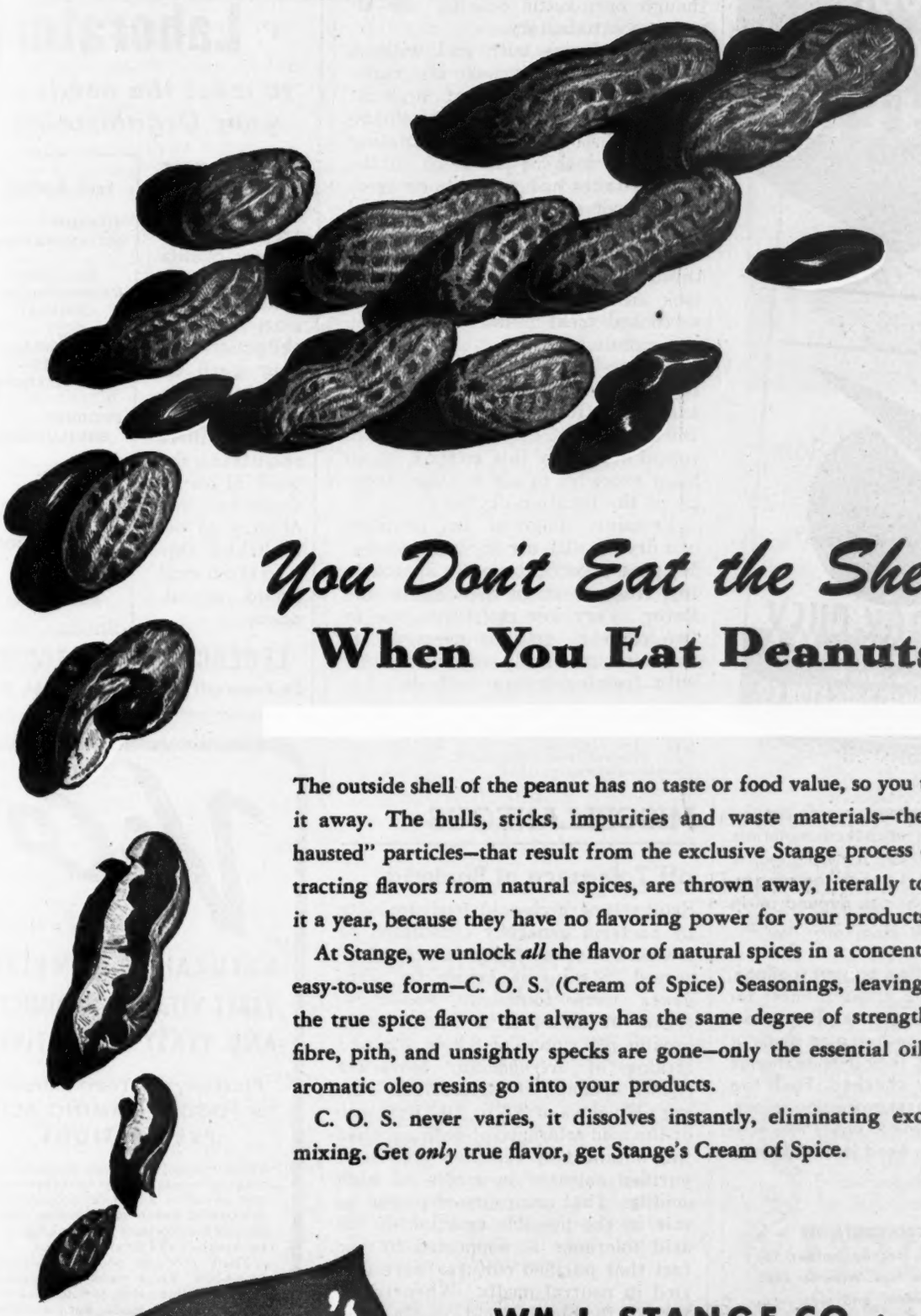
Digest from U. S. Patent 2,392,401, issued January 8, 1946, on an application dated July 29, 1942, to G. C. North and A. J. Alton, and assigned to Beatrice Creamery Co., Chicago, Ill.

Dehydrating Meat

MEAT can be dehydrated successfully by the drum-cabinet, retort-cabinet, air-rotary, drum-air flotation and freezing-cabinet methods. Of the pre-treatment methods, retort cooking followed by grinding resulted in the most rapid dehydration. Drum cooking, preceded by grinding, led to the slowest drying.

After grinding through a 1.125-in. plate, meat was cooked on a double drum dehydrator with drums separated 0.10 in. at a temperature of 338 deg. F. for 48 seconds, followed by regrinding through a 0.25-in. plate, spreading on screen trays, 1.5 lb. per sq. ft., and drying in a cabinet with through circulation of air at 180 deg. F. and not over 31 percent relative humidity. Longer cooking times and higher steam pressure in the drums reduced the time required to produce a dehydrated meat of 10 percent moisture. Drying times ranged from 2 to 6 hours, depending on cooking temperatures and drying air temperatures. High fat content made little difference except at higher temperatures when encasement of the meat particles reduced drying rate.

Pressure cooking of the meat before grinding through a 0.25-in. plate and then drying in a cabinet on trays spread 1.5 lb. per sq. ft., gave satisfactory results with air at 180 deg. F., or even as low as 160 deg. F. Again, meat of high-fat content dried more slowly at the elevated temperatures, even though the re-



You Don't Eat the Shells
When You Eat Peanuts

The outside shell of the peanut has no taste or food value, so you throw it away. The hulls, sticks, impurities and waste materials—the "exhausted" particles—that result from the exclusive Stange process of extracting flavors from natural spices, are thrown away, literally tons of it a year, because they have no flavoring power for your products.

At Stange, we unlock *all* the flavor of natural spices in a concentrated, easy-to-use form—C. O. S. (Cream of Spice) Seasonings, leaving *only* the true spice flavor that always has the same degree of strength. All fibre, pith, and unsightly specks are gone—only the essential oils and aromatic oleo resins go into your products.

C. O. S. never varies, it dissolves instantly, eliminating excessive mixing. Get *only* true flavor, get Stange's Cream of Spice.

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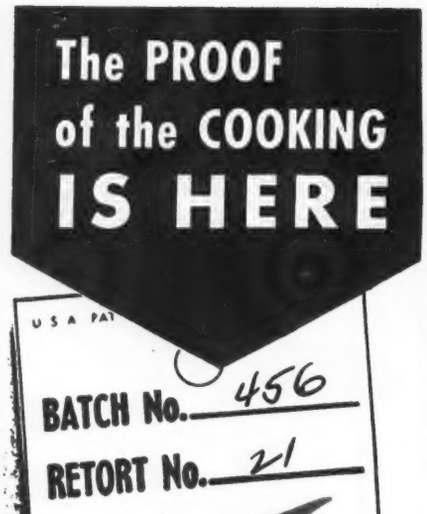

COOK-CHEX retort tags provide positive protection against uncooked materials. On every batch, a tag if *purple* warns: "Uncooked." But a *green* tag means: "Cooked." And you can depend on its unfailing accuracy.

ATI COOK-CHEX tags prevent spoilage, waste and possible embarrassment for less than 1/50¢ per case. They react only to moist heat, such as pure steam or superheated water. Their definite change in color is easily checked. Each tag serves as a permanent processing record. ATI COOK-CHEX will fit easily into your present procedure. Send in a trial order now. $9.75 per M.

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tort cooking removed part of the fat. Pressure-cooked meat dried faster than meat cooked in other ways, although open-kettle cooking was almost as satisfactory.

Rotary drums with and without steam heating tubes were also satisfactory, though meat of high-fat content tended to stick to the steam-heated tubes. A 6 ft. drier rotating 2.4 r.p.m. with 65-lb. steam in the heating tubes had an optimum feeding rate of about 5 lb. of precooked meat per hour. Another type of rotary drier using heated air blown through it as the drying medium took an initial charge of 25 lb. of precooked meat followed by 1.5 lb. per minute.

An air-flotation drier gave very rapid drying at high temperatures and a relatively high rate even at 160 to 180 deg. F. High fat did not retard drying by this method. Maximum exposure to air is characteristic of the flotation drying.

Freezing, followed by grinding and drying with air at 80 to 140 deg. F., gave a product closely approaching fresh meat in appearance and flavor. Very low moisture (one or two percent) may be necessary to restrain undesirable enzymic activity with freezing-drying methods.

Digest from "Producing Dehydrated Meats by Drum-Cabinet, Retort-Cabinet, and Other Methods," by O. G. Hankins and C. F. Dunker, *Food Research*, vol. 11, 1-13, January-February, 1946.

MISCELLANEOUS

pH Tolerance of Bacteria

SPOILAGE of high-acid food products by bacteria generally considered as low-acid-tolerant types has been observed. Strains of *Aerobacter aerogenes* were found to decompose cream of tartar in a liquid media having pH values of 3.9 to 4.2, and strains of *Aerobacillus macerans* caused spoilage of canned fruit having pH values of 3.8 to 4.0. Evidence of the acid tolerance of both bacteria was obtained by repeated growth of purified cultures in media of high acidity. That environment played no role in the possible creation of the acid tolerance is supported by the fact that purified cultures were carried in neutral media. When transferred to highly acid media they grew and caused decomposition of the fermentable constituents of the media. This suggests revaluation of present conceptions.

Digest from "A Note on pH Tolerance of Aerobacter Aerogenes and Aerobacillus Macerans as Related to Natural Ecology and Decomposition of Acid Food Products," by R. H. Vaughn and T. C. Stadtman, *Journal of Bacteriology*, vol. 51, 263, February, 1946.

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BOOKS

Soluble Soaps

SOAP IN INDUSTRY. By Georgia Leffingwell and Milton Lesser. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn, N. Y., 1946. 5½x8¾ in.; 203 pages; cloth. Price, $4.

This book discusses the soluble soaps, that is, the potash and soda soaps, as contrasted with the heavy metal soaps, which are not discussed. It stresses, particularly, the ever growing uses of these soluble soaps in industry.

At a time when so much emphasis is being placed upon sanitation in food processing plants, a book such as this should serve an important purpose.

Baking Story

THE BAKING INDUSTRY. By Mary Kinnavey Moore. Published by Bellman Publishing Co., Inc., 83 Newbury St., Boston 8, Mass., 1946. 6x9 in.; 32 pages; paper. Price, $1.

The publishers have chosen baking as the subject for the first monograph in a projected series on American industry. It covers every aspect of baking, including a brief outline of its history, a complete description of jobs and of the equipment necessary to the performance of those jobs.

The analytical index will be of great assistance to the baker who uses this booklet as a convenient reference.

Water Plants

MANUAL FOR WATER PLANT OPERATORS. By A. A. Hirsch. Published by Chemical Publishing Co., 26 Court St., Brooklyn, N. Y. 5¾x9¾ in.; 386 pages; cloth. Price, $6.50.

This manual aims to provide a practical text for study by operators of industrial water supply and sewerage systems. It should prove useful to both the food engineer and the food chemist, as it includes the most recent developments in water technology, disinfection, and the like, along with a discussion of such subjects as operation during various emergencies.

Reagent Applications

ORGANIC REAGENTS FOR ORGANIC ANALYSIS. Published by Chemical Publishing Co., 26 Court St., Brooklyn, N. Y., 1946. 5½x8¾ in.; 170 pages; cloth. Price, $3.75.

An up-to-date review of the application of reagents to organic analysis is provided in this little volume, prepared by the staff of Hopkin and Williams Research Laboratory. It is confined to the uses of organic reagents in the preparation of derivatives of organic substances for purposes of identifiation by melting points.

The book lists the major groups of organic compounds to be analyzed, and discusses the best reagents to be used for obtaining derivatives of each group. The important organic reagents are given in alphabetical order.

The scattered data, compiled and systematically arranged here, should save much time for the busy food chemist.

Emulsifying Agents

INTRODUCTION TO EMULSIONS. By Geo. M. Sutheim. Published by Chemical Publishing Co., 26 Court St., Brooklyn, N. Y., 1946. 5¾x9 in.; 260 pages; cloth. Price, $4.75.

The preface says this book was written by a practical man for practical men. Its purpose is to provide a fundamental study of emulsions, their principles, properties, methods of preparation and practical application.

A comprehensive alphabetical list of emulsifying agents, in table form, is included. This table gives the trade or commercial names of those in current use, their chemical composition, the group to which they belong, the type of emulsion they help to produce, the pertinent bibliography and the name of the manufacturer.

GOVERNMENT PUBLICATIONS

FROZEN FOODS AND LOCKERS. Prepared by Mary V. Day. Mimeographed, unnumbered. A bibliography. Available on request to Inquiry Reference Service, Bureau of Foreign and Domestic Commerce, Washington 25, D. C.

HOW TO PREPARE VEGETABLES AND FRUITS FOR FREEZING. Printed leaflet AWI-100. Available on request to Bureau of Agricultural and Industrial Chemistry, Washington 25, D. C.

FACTORS AFFECTING RESULTS OBTAINED WITH THE MONEY VISCOMETER. By Rolla H. Taylor. Circular of the National Bureau of Standards C451. Available from Superintendent of Documents, Washington 25, D. C. Price, 5 cents.

COST OF PRODUCTION AND DISTRIBUTION OF FISH IN THE GREAT LAKES AREA. Part VII of Report of the Federal Trade Commission to Congress, June

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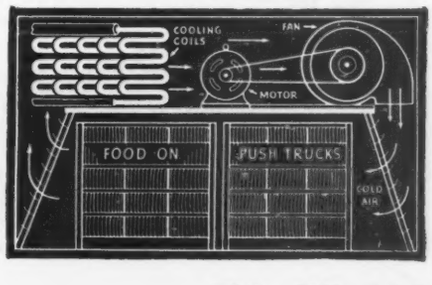

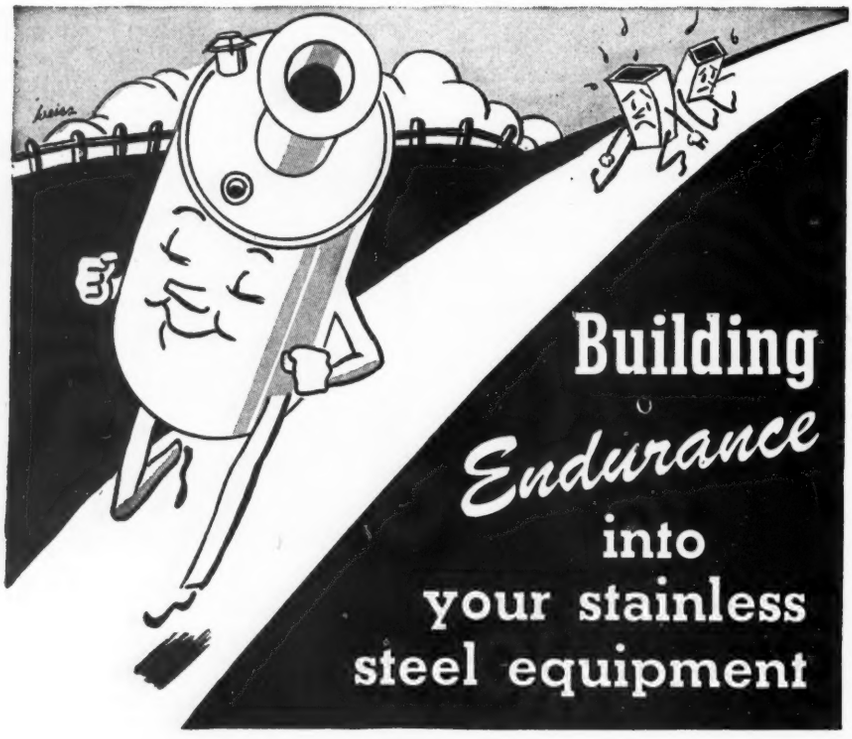

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30, 1945. Available from Superintendent of Documents, Washington 25, D. C. Price, 15 cents.

JAPANESE TRADE STUDIES. ANNOTATED TABULAR SURVEY OF THE TRADE OF JAPAN PROPER (INCLUDING THAT WITH KOREA AND FORMOSA). Unnumbered, processed. Available on request to United States Tariff Commission, Washington 25, D. C.

VETERANS STATUTORY REEMPLOYMENT RIGHTS. National Headquarters, Selective Service System. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.

RECORD KEEPING FOR SMALL STORES. (Revised). Senate Committee Print No. 2, 79th Congress. Available from Superintendent of Documents, Washington 25, D. C. Price, 35 cents.

HEALTH-BENEFIT PROGRAMS ESTABLISHED THROUGH COLLECTIVE BARGAINING. Bureau of Labor Statistics Bulletin No. 841. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.

CREDIT SOURCES FOR SMALL BUSINESS. Department of Commerce. Available from Superintendent of Documents, Washington 25, D. C. Price, 15 cents.

DATE CULTURE IN THE UNITED STATES. Department of Agriculture Circular No. 728. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.

RELATION OF FEED CONSUMED TO FOOD PRODUCTS PRODUCED BY FATTENING CATTLE. Department of Agriculture Technical Bulletin 900. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.

WAGES OF AGRICULTURAL LABOR IN THE UNITED STATES. By Louis J. Ducoff. Department of Agriculture Technical Bulletin No. 895. Available from Superintendent of Documents, Washington 25, D. C. Price, 25 cents.

EFFECT OF VARIETY, LOCATION, AND SEASON ON OIL, PROTEIN, AND FUZZ OF COTTONSEED AND ON FIBER PROPERTIES OF LINT. By O. A. Pope and J. O. Ware. Department of Agriculture, Technical Bulletin No. 903. Available from Superintendent of Documents, Washington 25, D. C. Price 10 cents.

FOODS—ENRICHED, RESTORED, FORTIFIED. Printed leaflet AIS-39. Available free on request to Bureau of Human Nutrition and Home Economics, Washington 25, D. C.

COLOR MEASUREMENT AND ITS APPLICATION TO THE GRADING OF AGRICULTURAL PRODUCTS. By Dorothy Nickerson. Department of Agriculture, Miscellaneous Publication 580. Available from Superintendent of Documents, Washington 25, D. C. Price 25 cents.

PATENTS

CEREALS

Cocoa Beans Heat-Treated at 140 to 150 Deg. F. for 15 to 20 Minutes, Ground and Subjected to Heating and Aeration at About 100 to 160 Deg. F. for 3 to 6 Hours to Reduce Astringency—George Lawton, Highgate, London, England. No. 2,398,945. April 23, 1946.

Grain Germs Defatted to Make Stable, Non-Toxic and Palatable Dry Food Products With High Content of Vitamin B—Ezra Levin, Monticello, Ill. Reissue No. 22,748. April 30, 1946.

Spent Distiller's Mash Treated With Yeast Autolyzing Agent and Aspergillus oryzae Enzyme and Concentrated by Evaporation to Make Food Product—Robert McDowell Allen, New York, N. Y. and Frederick E. Timmer, Hasbrouck Heights, N. J. No. 2,396,234. Mar. 12, 1946.

CONFECTIONERY

Chocolate-Flavored Confectionery Product Made by Adding Crystalline Sugar and Cocoa to Hot Aqueous Agar Solution, Homogenizing While Hot, Cooling, Grinding, and Drying—Francis A. Bodenheim, Kew Gardens, N. Y. No. 2,399,195. April 30, 1946.

DAIRY

Ice Cream Mix Made to Contain Small Quantity of Ester of Hexahydric Sugar Alcohol and Saturated Higher Fatty Acid—Harold E. Moore, Columbus, Ohio. No. 2,398,950. April 23, 1946.

Powdered Cream Made to Contain 0.5 to 3.0 Percent Added Lecithin Based on Dry Weight of Cream Powder—Gerald C. North, Evanston, and Alvin J. Alton, Chicago, Ill., to Beatrice Creamery Co., Chicago, Ill. No. 2,399,565. April 30, 1946.

DEHYDRATION

Coffee and Cream Soluble Product Made by Mixing Two Parts Liquid Coffee Extract With Specific Gravity of 1.120 to 1.160, One Part Fresh Cream and One Part Evaporated Milk and Concentrating by Precipitation in Heated Atmosphere—Clinton W. Carter, Allison Park, Pa. No. 2,398,081. April 9, 1946.

FATS AND OILS

Fatty Glycerides Treated With Low Molecular Weight Monohydric Alcohol in Presence of Alcoholysis Catalyst to Make Esters of Fatty Acids and Glycerine—Walter Russell Trent, North Arlington, N. J., to Colgate-Palmolive-Peet Co., Jersey City, N. J. Reissue No. 22,751. April 30, 1946.

Glyceride Fats and Oils Stabilized Against Rancidity by Addition of Tocopherol and Trypsin, Pepsin or Clarase—Mayne R. Coe, Jr., Seabrook, Md., and Mayne R. Coe, Washington, D. C., to United States of America. No. 2,397,920. April 9, 1946.

Soya Oil Subjected to Nascent Chlorine and Subsequently to Nascent Oxygen to Give It Drying Properties—Fred J. Stark and George H. Slack, Peoria, Ill., to Fred J. Stark, George H. Slack, R. M. Rutledge and Harry A. Hirst. No. 2,399,697. May 7, 1946.

Vegetable, Animal and Fish Oils, Fats and Waxes Protected Against Rancidity by Addition of Thio Di-Fatty Acids or Their Esters—Daniel Keith O'Leary, Mendenhall, Pa., to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 2,397,976. April 9, 1946.

FERMENTATION

Molasses Fermented With Clostridium Madisonii to Produce Butyl Alcohol and Acetone—Elizabeth F. McCoy, to Wisconsin Alumni Research Foundation, Madison, Wis. No. 2,398,837. April 23, 1946.

MEATS

Meat Sliced Into Relatively Thin Portions, Stretched, and Compressed to Form Compact Mass Unit—Grover R. Henney, Chicago, Ill., and John H. Johnson, Belleville, Ill., to Industrial Patents Corp., Chicago, Ill. No. 2,398,636. April 16, 1946.

PACKAGING

Foods Packaged in Sealed, Flexible Container of Thermoplastic Film Cooked Under Steam Pressure Without Injury to or Rupture of Container—Chester J. Cavallito, Rensselaer, N. Y., to Wingfoot Corp., Akron, Ohio. No. 2,398,082. April 9, 1946.

VITAMINS

Riboflavin Derivaties Synthetically Prepared—Gerhard Julius Haas, New York, N. Y., to Hoffman-La Roche, Inc., Roche Park, Nutley, N. J. No. 2,398,706. April 16, 1946.

MISCELLANEOUS

Grapes Washed, Dried, Crushed, Juice Clarified, and Solids Separated Into Pulp, Pits and Skins Free From Stems by Continuous Operation—Georges Monnet, New York, N. Y. No. 2,398,440. April 16, 1946.

Potatoes Peeled by Immersing in Water Solution of Caustic Soda and Sodium Chloride at Higher Than 220 Deg. F—Ralph W. Miller and Osceola W. Andrews, Barberton, Ohio, to Pittsburgh Plate Glass Co., Pittsburgh, Pa. No. 2,399,282. April 30, 1946.

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Salt usually cakes in excessive humidity, because moisture condenses on salt particles, forming a thin layer of brine. Then, in dry weather, the brine evaporates and the crystals knit together.

Our research laboratory has found a number of ways to help prevent salt caking. Removal of moisture-attracting impurities, such as calcium chloride, helps. So does complete removal of fines by careful screening. Most important is to provide salt with a moisture- and vapor-resistant package.

Take our Flour Salt bag, for example. It is composed of three 50-lb. and two 25-lb. sheets of kraft, laminated together with 40 lbs. of asphalt per ream. That's a lot of asphalt, and it costs us more money—but our moisture-vapor transmission tests show this bag is worth the extra cost. The bag is even sewn with *waxed thread* to seal the holes made by the sewing-machine needle. That's real *protection*—one reason we have been able to eliminate caking as a major problem!

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Rapids-Standard Floor-Veyors are power belt conveyors manufactured specifically for use in between floor operations. Easy to install, they can even be placed in stairways without seriously interfering with foot traffic. Floor-Veyors are standardized units and are shipped in any specified length up to 30 feet. They are crated and shipped as a finished product, ready for immediate installation without difficult erection problems or costly fabrication work. Your "handy-man" can easily cut a floor opening and set this unit into place.

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Debunking a Theory

(*Continued from page* 85)

flies were observed on the red packages. Periodic observations made on the relative numbers of flies alighting on a given package revealed the difficulty of differentiating between the other colored packages from the standpoint of fly attraction.

The most significant finding was the attraction of considerably more flies to the foil-wrapped packages than to any of the colored packages employed in this investigation. Speck counts differed considerably, however, between the two foil packages. The first package exhibited approximately twice as many specks as the second package, indicating the desirability of duplicating the tests.

This investigation demonstrated the futility of employing yellow wrappers or foil wrappers for packages with the object of repelling flies and obviating any fly-specked condition.

— *End* —

Employee Relations

(*Continued from page* 74)

that such introductions are made productive of good employee feeling and in following up the progress of each employee on his job.

Separation policies, which build sound public relations, must be an integral part of the program.

2. Continuous training of every member of the organization—Human relations cannot be left to chance if the management of men is to achieve the status of job management. Executives and employees need training in the art of getting along with each other and in the technics of communication. The development of an enlightened management and a cooperative employee group depends upon the building up of attitudes of understanding and mutual faith.

Conference groups for the discussion of personnel and operating problems form a core for any successful training program. The getting together of safety, operating, employment, medical and personnel heads constitutes a basis for the free flow of communication. Training in interviewing, public speaking, suggestion and grievance procedures is eagerly sought by supervision.

3. Personnel research, planning and records—Knowledge of what employees are thinking about the company and their jobs and how they are reacting to the people in their

You've sniffed the clouds of rich smells rising from a kettleful of home-made soup . . . inhaled the appetizing aromas of simmering beef or chicken stock, spices and seasoning, fresh vegetables.

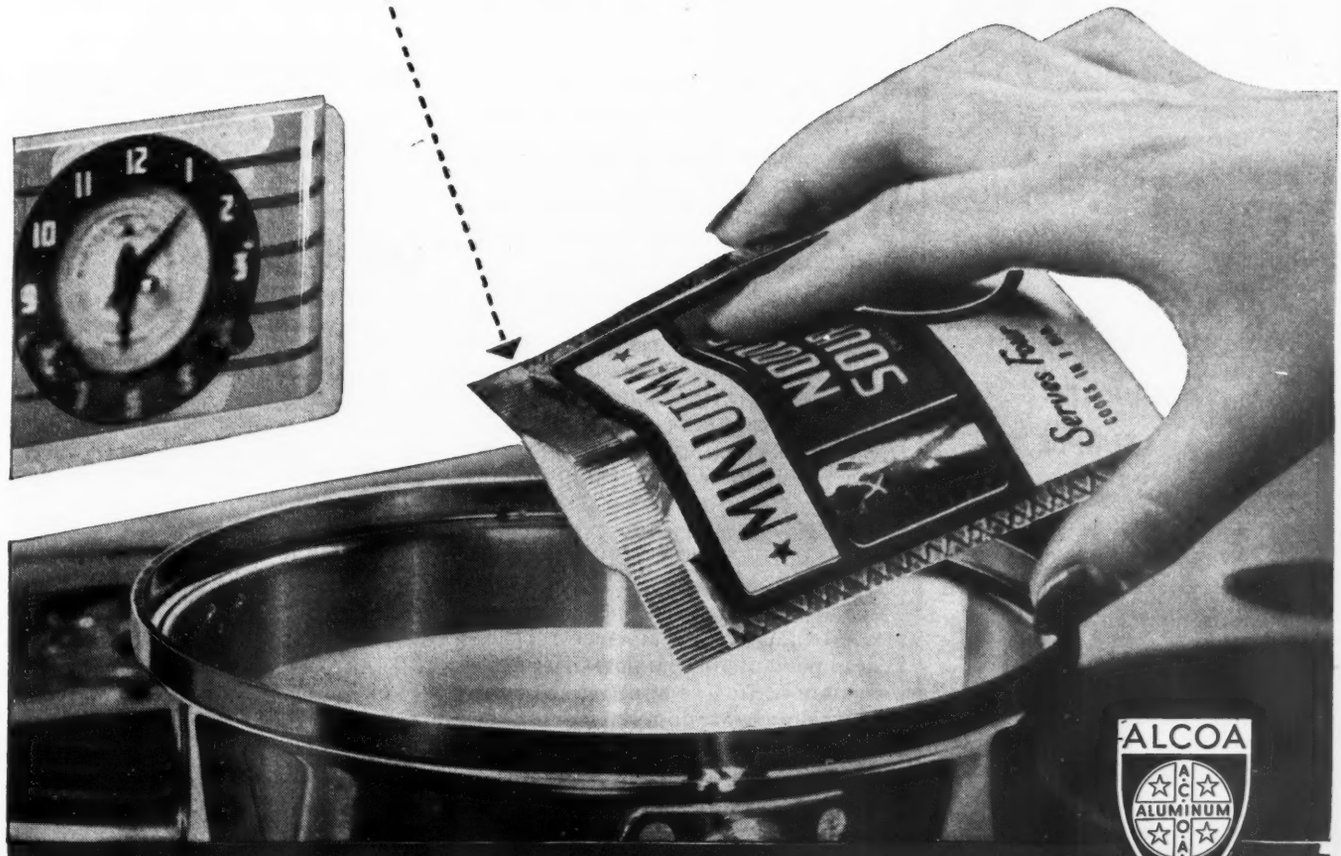
You'll find all those aromas and flavors captured in the modern dehydrated soup mixes. Flavor and aroma are protected from the soup maker's plant to the kitchen in a heat-seal package made of aluminum foil.

The combination of Alcoa Aluminum Foil and heat-sealing *locks in* the goodness and flavor of soup mixes and other dehydrated foods, *locks out* air and foreign odors. Prevents rancidity and oxidation. The package is greaseproof and moistureproof . . . and is easy for the homemaker to open.

Package designers and converters of Alcoa Aluminum Foil will be glad to work with you on a package of this type for your product, fresh or dehydrated. For their names, get in touch with our nearest sales office. Or write to ALUMINUM COMPANY OF AMERICA, 1845 Gulf Building, Pittsburgh 19, Pennsylvania.

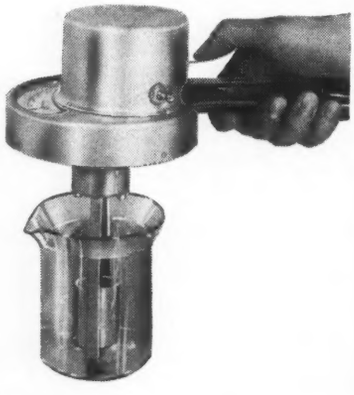
How to wrap up that good aroma

OF MOM'S KITCHEN ON "SOUP DAY"



ALCOA ALUMINUM FOIL

TEST VISCOSITY in 30 Seconds with a Brookfield *Synchro-Lectric* VISCOSIMETER



★ *FAST*
★ *ACCURATE*
★ *SIMPLE*
★ *STURDY*

Save valuable production time and get closer control by running viscosity tests right on the job. Variable speed units make it possible to measure materials of plastic flow at different rates of shear.

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departments, in short, what type of employee relations exist at a given time, is one of the major jobs of personnel research. On the basis of this information, appropriate changes in procedures can be made. Is a receptionist in the employment department antagonizing applicants? Are the employees in department X being pushed around by a sadistic foreman? Do the employees rating blanks need overhauling? Such questions come to personnel research for appraisal and proper channeling.

The keeping of detailed employee records builds continuity in personnel relations. The use of such cumulative records as aids in employee counseling and rating is one of the phases of employee relations work in its pioneer stages.

4. All the plans for employee security—Insurance, hospitalization, pensions and savings plans cushion emergencies and give peace of mind to employees.

Policies of termination pay and plans for guaranteed work or income contribute to the confidence of employees.

A complete wage evaluation and employee rating system protects the employee in selection, placement, promotion and wage scales. Incentive plans find their place as a means of giving additional employee security.

5. Carefully planned and executed employee services and activities—Courteous and efficient medical service proves to the employee the interest of the company in him.

Food facilities, which are pleasant and serve nutritious food, tend to make healthy and satisfied employees.

Clean, comfortable rest rooms and washrooms, with enough equipment to carry the peak load and under good supervision, must be installed and maintained for smooth running employee relations.

Employee counseling can function only so far as it receives support from top management and is conducted by trained counselors. There is no function of employee relations so important for the flow of two-way communication as effective personnel counseling, forming liaison between personnel, operation and management.

Recreational and educational activities play an important part in helping the employee make the most of himself and feel a part of the group.

Publications, such as employee magazines, employee handbooks and weekly papers offer management a medium for the exchange of ideas and plans. No better source exists

Savings EFFECTED BY ST. REGIS PACKAGING SYSTEMS

CASE HISTORY #1 . . $5.71 per ton

saving on container	$5.46
saving on packaging operation	$ .25
total saving	$5.71

CASE HISTORY #2 . . $2.50 per ton

saving on container	$1.32
saving on packaging operation	$1.18
total saving	$2.50

CASE HISTORY #3 . . $1.80 per ton

saving on container	$1.64
saving on packaging operation	$ .16
total saving	$1.80

CASE HISTORY #4 . . $1.56 per ton

saving on container	$1.55
saving on packaging operation	$ .01
total saving	$1.56

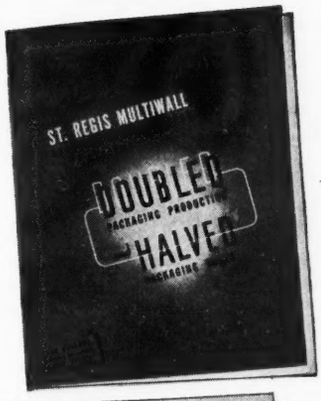
CASE HISTORY #5 . . $5.06 per ton

saving on container	$3.56
saving on packaging operation	$1.50
total saving	$5.06

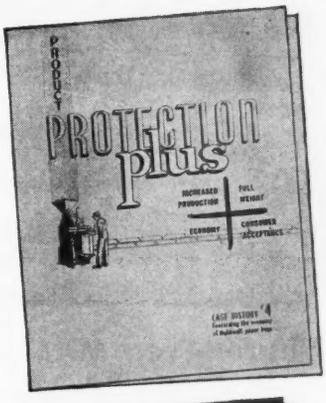
Multiwall paper bags are now serving American industry in high-speed machine packaging of over 300 different chemical, food, fertilizer and rock products. These five "case histories" outline the detailed factual experience of leading concerns in the use of fast, cost-saving St. Regis Packaging Systems.

WATCH THESE PAGES FOR FURTHER CASE HISTORIES

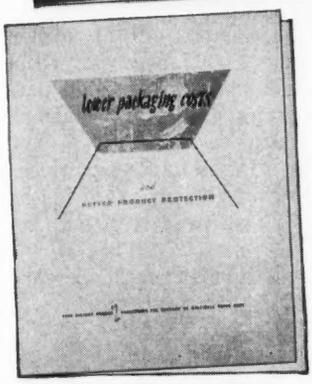
THESE "CASE HISTORIES" SHOW HOW ST. REGIS PACKAGING SYSTEMS INCREASE PRODUCTION — REDUCE PACKAGING COSTS



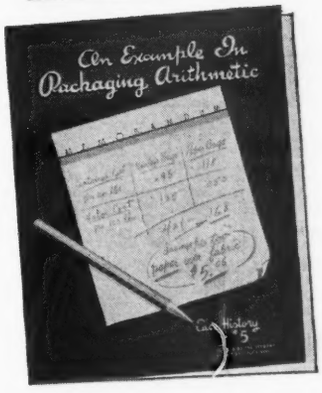
1 manufacturer of ready mixed cake flours . . . installation of a St. Regis Valve-bag Packaging System raised production from 9,000 lbs. per hour to 18,000 lbs. per hour with no increase in labor costs.



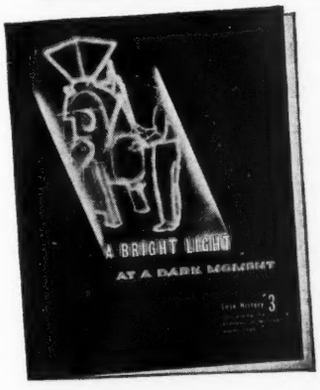
4 prominent salt manufacturer increased packaging output 18% with the same crew by changing over to the St. Regis Valve-bag Packaging System . . . and effected a saving of 45% in overall packaging costs.



2 several well-known fertilizer manufacturers were using eight men to pack burlap bags. St. Regis Valve-bag Packaging Systems enabled these companies to "up" production 20% per hour with only 5 men packing and handling.



5 manufacturer of cocoa installed a St. Regis Valve-bag Packaging System. Result: an increase of 62½% in production, a saving in labor costs of 60%, a saving in container costs of over 55%.



3 manufacturer of granite poultry grit formerly employed a 14-man crew to fill, sew and handle a maximum output of 60,000 lbs. per hour. Installation of a St. Regis Valve-bag Packaging System enabled poultry grit manufacturer to double production with smaller crew . . . reduce container costs 54.4%.

The "case histories" illustrated above have proved of great value to manufacturers throughout the country . . . perhaps they will be of equal value to your company. Write for the folders that interest you the most . . . or, if you would prefer to have a St. Regis sales representative talk over your specific problems with you, just 'phone or write your nearest St. Regis Sales Office.

Years of experience in the pioneering of automatic packaging in multiple-layer paper bags has enabled St. Regis to recommend the correct packaging system to suit the needs of manufacturers of over 300 different products including chemical, food, fertilizer and rock products. The coupon is for your convenience.

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No. Kansas City, Mo. Ocala, Fla. Oswego, N. Y. Seattle Toledo

IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal, Vancouver.

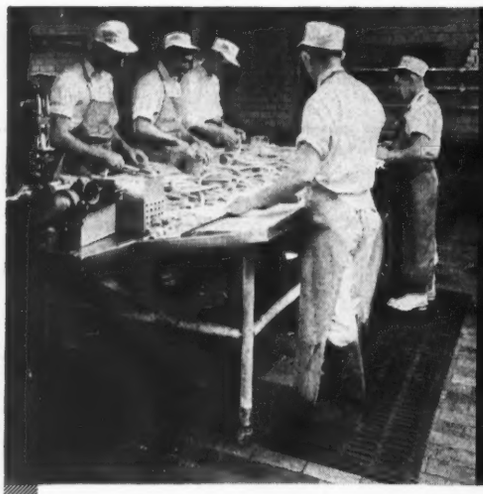
Without obligation, please send me full details regarding "Case Histories" outlined above.

No. 1 ☐ No. 2 ☐ No. 3 ☐ No. 4 ☐ No. 5 ☐

Name_____

Company_____

Address_____



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Neo-Cord Counter-Tred

Contains no rubber
Made with Dupont Neoprene

AMERICAN Counter-Tred MATTING

A tough, durable, long-wearing rubber and cord matting with a resilient non-slip surface that affords safety in wet or slippery areas. Promotes sanitation. Ridged bottom affords aeration and drainage. Easily handled for cleaning. Adheres perfectly to the floor. Keeps the feet dry. ⅝" thick, 24" wide, any length.

AMERIFLEX Flexible Hardwood Link MATTING

Links are held on galvanized steel springwire framework. Lies flat. Follows contour of the floor. Beveled edges. Can be rolled or folded.

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TIRE FABRIC MATTING
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Write for prices and folder, "A Mat for Every Purpose", describing matting for promoting safety, providing comfort, reducing fatigue and furthering sanitation.

AMERICAN MAT CORPORATION

"America's Largest Matting Specialists"

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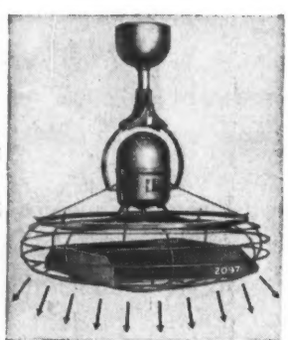
Reco FLY CHASER FANS



SOLVE THE FLY PROBLEM ONCE AND FOR ALL

The RECO, when installed over an entrance or other opening, blows a large volume of air downwards, forming a screen of air which flies do not pass through. People can come and go as they will, but the flies stay outside. Avoids the expense, labor and muss of sprays and other out-of-date fly prevention methods.

Write for Bulletin 230 giving complete information.

REYNOLDS ELECTRIC COMPANY

Mfrs. of Refrigerator Fans, Fly Chaser Fans, Air Circulators, Food Mixers and Vegetable Peelers.

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WATER FOR FOOD PROCESSING STERILIZED BY BREAK-POINT CHLORINATION

INDUSTRIAL DIVISION
WALLACE & TIERNAN
NEWARK 1, NEW JERSEY
REPRESENTED IN PRINCIPAL CITIES

for the indoctrination of sound attitudes in both management and labor than in such publications.

6. On the job relations—The establishment of good coworker relationships constitutes one of the major responsibilities of supervisors. But even more important is the attitude of the workers towards supervision and management. If better understanding and cooperation are not being developed, antagonism and labor trouble are the alternative.

Summary and Clarification

The confusion existing today in the thinking of some executives concerning employee relations must be clarified. The use of the same methods as those used in any control situation is indicated: an evaluation of the present situation by an expert in man management—from either within the organization or from the outside; the choice of a trained person to head the employee relations department; the writing of a personnel code of standard practices; the setting up of the program in the light of the best practice; and reevaluation.

The way to start an employee relations program is to start one!

—End—

Screw Conveyors

(*Continued from page* 89)

low level in the trough to avoid contact with hanger bearings or interference with hanger frames. This last classification includes such materials as silica sand, pulverized quartz, coke and flue dust.

Chart VI is based on the screw being filled to 90 percent. It applies only to screws used as feeders. The screw is completely submerged in the material being fed or conveyed. The use of hangers in the feed section of the conveyor should be avoided.

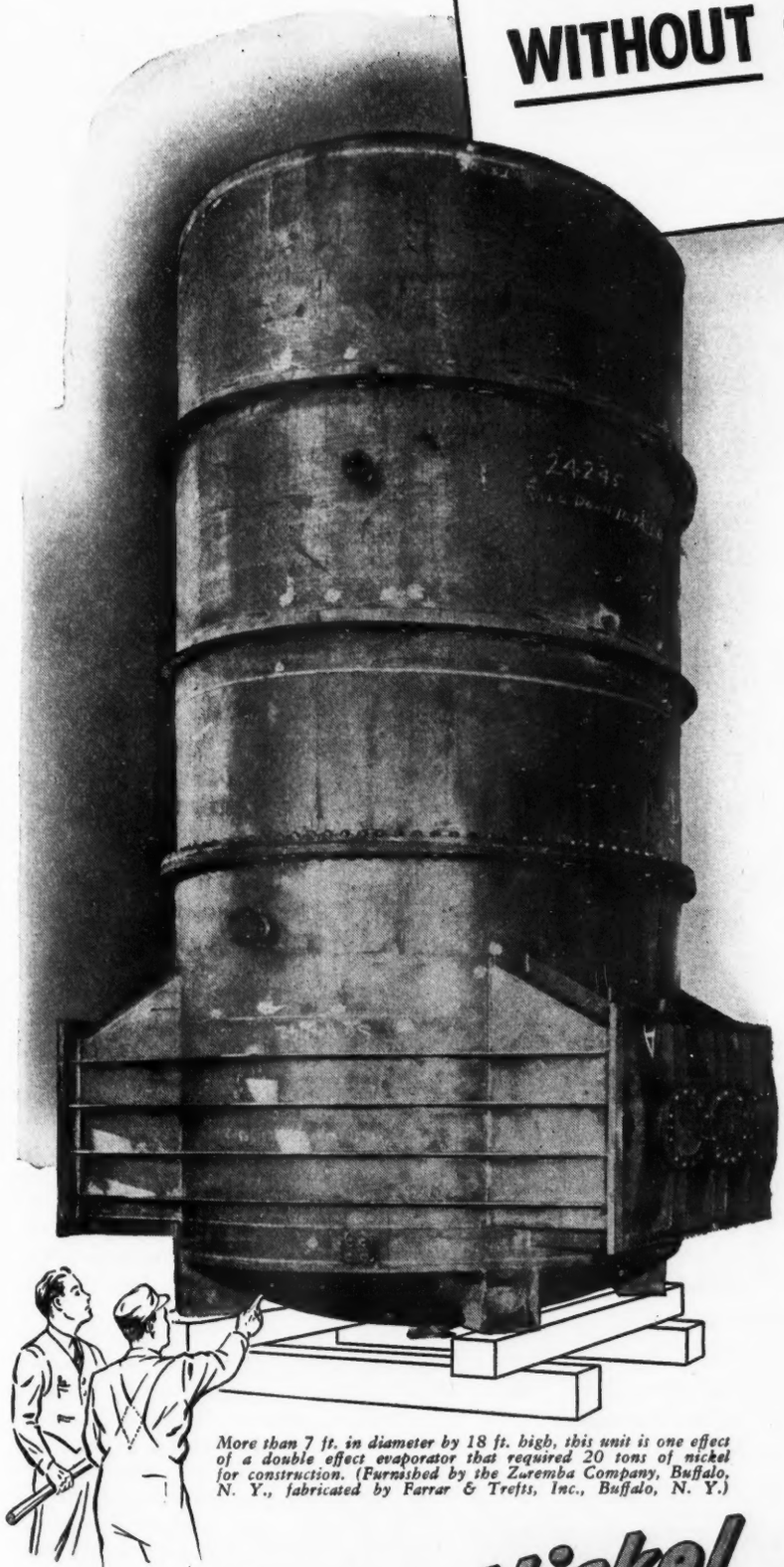
Maximum Lump Size

The maximum size of lumps that can be handled successfully in a conveyor, depends upon the diameter of the screw, the percentage of lumps with respect to total volume of the material to be handled, and to some extent upon whether or not the lumps can be partly crushed by the conveyor. When the material is all lumps, such as screened products, the maximum size that can be handled is smaller than when the lumps comprise only 20 to 25 percent of the total.

Clearance between flights and trough should be increased to approximately the average lump size

Built for Concentration...

WITHOUT CONTAMINATION!



More than 7 ft. in diameter by 18 ft. high, this unit is one effect of a double effect evaporator that required 20 tons of nickel for construction. (Furnished by the Zaremba Company, Buffalo, N. Y., fabricated by Farrar & Trefts, Inc., Buffalo, N. Y.)

Four words tell why this gelatin evaporator is made of pure nickel.

Nickel protects product purity.

That's an important characteristic, not only in gelatin manufacture, but in the processing of tomato juice, catsup, soups, brines, syrups, chocolate, citrus juices and other food products.

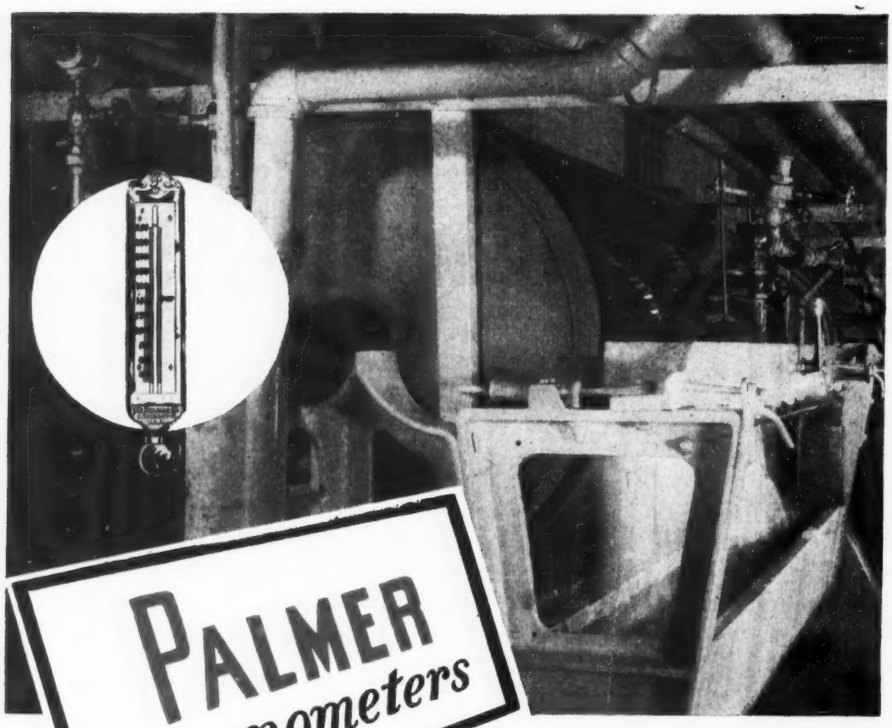
Nickel, because it is completely rustproof and highly resistant to corrosive attack, guards against metallic contamination and discoloration. It also has tough strength to withstand long, hard use.

Its ability to transfer heat rapidly is still another advantage that nickel processing equipment brings you.

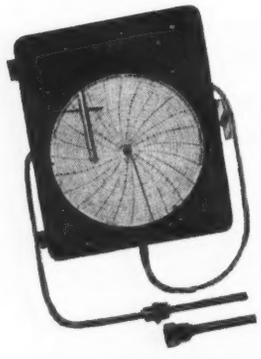
In our illustrated reference booklet, *Heat Transfer Through Metallic Walls,* you'll find tables of thermal conductivity, charts of heat transfer coefficients for 11 metals, and full information on the heat transfer properties of nickel. A copy of this helpful booklet is yours for the asking. Write for it—*today.*

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

USE PURE *Nickel* WHERE PURITY COUNTS



help maintain
UNIFORM HIGH QUALITY
in
'CRISCO'



red reading mercury

• At Proctor & Gamble, uniform high standards must be rigidly adhered to . . . and it is not surprising that *Palmer Thermometers* have been selected to help maintain such high standards in their "Crisco."

• Palmer Thermometers were selected because of their extreme accuracy and their patented easy-to-read mercury column. Palmer Thermometers are ruggedly constructed, too, for long, dependable service.

• To assist your engineers in improving the quality of your products, give them the advantage of reliable Palmer Thermometers. Write for Catalog No. 200.

PALMER THERMOMETERS, INC.
Mfrs. Industrial, Recording, Laboratory and Dial Thermometers
2329 Norwood Avenue Cincinnati 12 (Norwood), Ohio

when handling materials containing a large percentage of lumps that do not crush easily. Table I shows maximum permissible lump size for conveyors of different diameters.

Maximum Speeds

The speed curves on Charts I to V indicate the maximum speed of rotation recommended for screw conveyors of standard diameters, when handling each of the five classes of materials. The speeds for screw feeders, Chart VI, may vary from 5 r.p.m. on a low speed installation to as high as 200 r.p.m on a high speed batching unit. Since hangers are not regularly used on such installations, the speeds may be quite high.

Horsepower Required

Horsepower required for a standard pitch, horizontal screw conveyor of standard design, is found from the formula given in Table II, in conjunction with the factors given in Table II and Table III. Table III also shows characteristics of materials suitable for handling by screw conveyors.

Vertical Lift Screw Conveyors

Vertical lifts can be made on the screw conveyor principle, with no intermediate hangers or bearings, to a practical height of 50 ft. They are able to attain capacities as high as 60 tons hourly. The Screw Conveyor Corporation, Hammond, Ind., through a special patent, is able, however, to attain practical heights of 85 ft., with the aid of internal off-set bearing hangers.

These installations are well suited to handle fine, dusty materials, such as cereals, cottonseed, bulk cement, hydrated lime, and other pulverized products.

A vertical conveyor is usually suspended from the top. This is the principle used in horizontal conveyors, especially on long lines, when the thrust bearing is located at the discharge end. The screw pulls the material toward the thrust bearing, doing away with any tendency to buckle under a heavy load.

This article has thus far dealt primarily with only the screw conveyor for transfer of materials in modern industrial plants. There are several other types of materials handling equipment, all widely accepted. Two of the older are the belt, from the flat, through the various degrees of trough, and the cup or bucket conveyor, with all of its many buckets for special jobs.

One of the later arrivals on the scene of materials handling machin-

IMPROVED PRODUCTION...
right up Alvey's Alley!

That's why the products of leading Food Industries move on...

ALVEY ST. LOUIS *Conveyors*

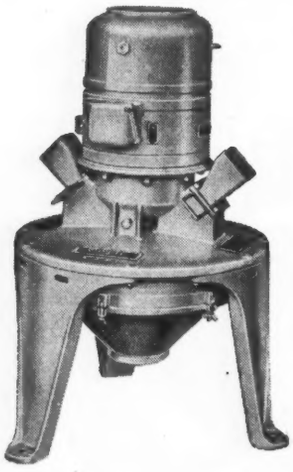
ALVEY CONVEYOR MANUFACTURING CO. 2201 SOUTH BROADWAY, ST. LOUIS 18, MO.

PROTECT YOUR PRODUCTS

"ENTOLETER" SYSTEM GIVES CONTINUOUS

BUG CONTROL plus!

Operating records prove that "ENTOLETER" Continuous Control destroys all forms of insect life. In addition to this service, mills and food plants are reaping other benefits from the "ENTOLETER" system. Here are three positive advantages.



1 KILLS ALL INSECT LIFE

Now, more than ever, your plant and products need the "ENTOLETER" system of continuous insect control. It helps you to avoid waste of scarce food materials . . . to protect 80% flour . . . to insure the high standards of your products.

2 ESSENTIAL IN FRAGMENT CONTROL

The "ENTOLETER" system is being used successfully to reduce fragment count. Send for copy of our latest bulletin describing methods of application.

3 AIDS PRODUCT UNIFORMITY

Food plants and flour mills have found that the "ENTOLETER" system offers an excellent means of blending flours, mixing ingredients in compounds and improving vitamin distribution. This, alone, more than justifies its cost.

For full information on "ENTOLETER" Continuous Insect Control System, write to ENTOLETER DIVISION, The Safety Car Heating and Lighting Co., Inc., P. O. Box 904, New Haven 4, Connecticut.

ENTOLETER

INFESTATION DESTROYER

REG. U. S. PAT. OFF.

ery is the Redler (or skeleton-flight) conveyor. Perhaps the latest entrant is Link-Belt's "Bulk-Flo," which is able to deliver past a dog-leg bend or other angle without necessitating anything in the way of additional equipment.

Pneumatic conveying should be mentioned here in order to round out the picture, but it is an infant in comparison with the better than 2,000 years of the screw method. The field of materials conveyance is a large one, and there is room for all the different forms described. Each has its special field of application. No single form can fill all the needs.

—End—

New Consistometer

(*Continued from page* 80)

Twenty-five samples of corn were selected that covered the range from thin to fairly heavy corn. Two operators, independently, ran two separate tests on each of the 25 samples. The chart demonstrates the consistometer's differentiation and reproducibility. The maximum difference between operators and duplicate tests was only one-half of a consistency point, which indicates that the results are satisfactorily reproducible.

Interpreting the Readings

If descriptive labeling is preferred, the Adams Consistometer can be used as an objective means of defining the descriptive terms that apply. A tentative correlation between the recommended descriptive terms and the equivalent consistometer readings is as follows:

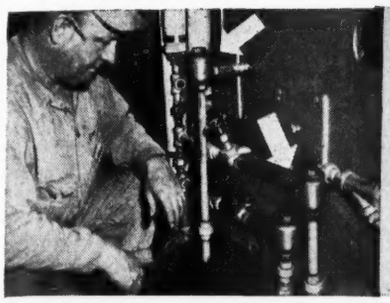
Adams Consistometer readings	Descriptive terms
12 to 15	Heavy consistency
7 to 12	Medium consistency
Less than 7	Light consistency

Consistency of cream style corn now can be measured objectively and accurately by the use of this device so that different observers can obtain substantially the same results.

Other Applications

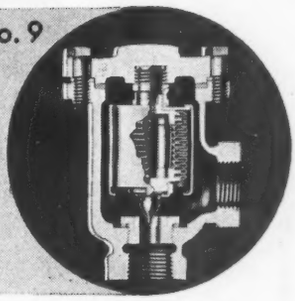
While this consistometer was designed primarily for measuring consistency of cream style corn, there are possibilities of using it in judging the consistency of other products. These possibilities have not been fully explored with other foods more than to note that they respond fairly well to this type of measurement. Blackberry preserves and apple sauce need consistency measurements in determining their quality and both seem to lend themselves well to the use of the Adams Con-

HOW SARCO SAVES
IN THE FOOD INDUSTRY

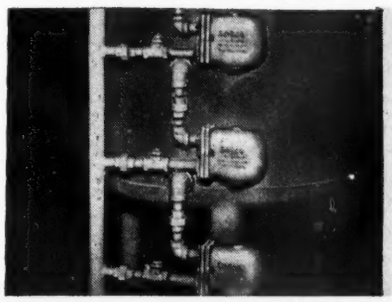


Bottling

No. 9

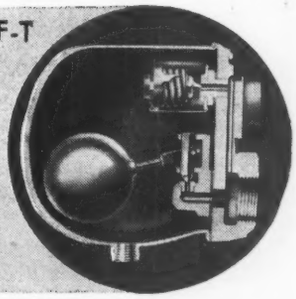


The Sarco No. 9 thermostatic steam trap is a well known standard — one on each coil of bottle washing machines. They keep production up — cost little and now have double their previous capacity. Bulletin No. 250.



Evaporators

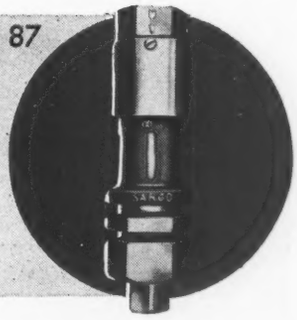
F-T



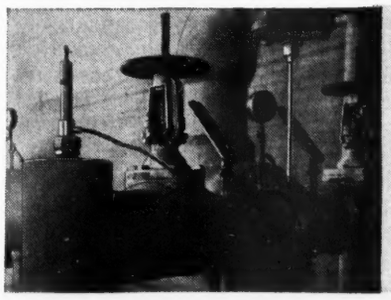
For the steady—all day pull—Sarco float-thermostatic traps are ideal. There is no shock to the steam line—all air is bypassed continuously. Three ranges for all pressures. Used extensively in connection with Sarco TR-21 temperature control. Bulletin No. 450.

Chocolate Tempering

No. 87

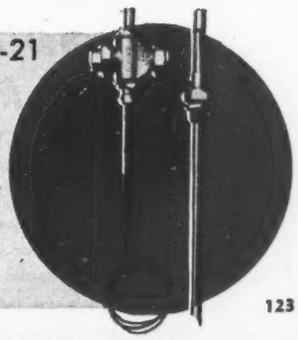


Wherever temperatures are important, Sarco temperature controls save their cost in a few months. This tank is controlled by the simple, inexpensive Sarco No. 87. Other types for all purposes. Bulletin Nos. 250 and 550.



Beverage

TR-21



In this brewery, exhaust steam, otherwise wasted, is used to boost the temperature of large quantities of wash water. The Sarco TR-21 regulator controls the temperature and makes large savings possible. Bulletin No. 600.

123

FOUR STARS ON OUR E PENNANT TESTIFY TO SARCO PERFORMANCE IN THE WAR EFFORT

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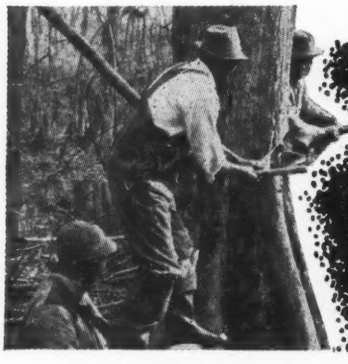

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...Its Superior Qualities Make It Ideal for a Wide Range of Industrial Uses

The Indians knew it, the Spaniards knew it, the French knew it, and those of English decent of the Southeastern regions have known for 150 years the superior qualities of Tidewater Red Cypress and its resistance to decay. Along the Atlantic Coastal Plain where lie buried cypress trees that grew over 100,000 years ago in the Pleistocene Age, many of which have since been dug up, give mute evidence of the lasting qualities of cypress never equalled for its decay resistance. In more recent years industry has also learned that it licks the difficulties of odor, taste and acid. Tidewater Red Cypress has ALL the qualities you demand for many specific industrial demands.

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sistometer. A modification of the Adams Consistometer is being adapted to the measurement of consistency of pancake batter. Adjustment of consistency has been one of the chief impediments to the establishing of a standard pancake flour baking test and it is believed that this device will supply a means of making a quantitative measurement of this factor.

— End —

Adequate Sample

(*Continued from page* 84)

plants grown on land variously fertilized and selections were made according to the number of locks of the bolls: three, four or five.

In one set of 70 samples, single chemical determinations of the oil content were made. From this larger group, 35 samples were selected for chemical analysis, using duplicate determinations. Statistical methods then served to determine which of the two sets of data, each involving the same number of analyses, gave the more reliable information regarding the oil content of the seeds in the fields sampled. The making of a single analysis on each of the larger number of individual samples was found to be the more precise method of testing the field material. Chemists traditionally run duplicate samples whenever possible. Moreover, this group of technologists will not easily be swayed from their long established practice. Chemists are, however, giving increasing attention to the use of statistical methods. They will be ready to test the new technics as they prove of value.

A third and last case is concerned with the sampling of eggs. A Washington food broker frequently pays a nominal sum for the sampling of carload lots of eggs at central shipping points. One of the methods widely used in the Chicago area involves the selection of six cases from a car of 600. From each of those six cases, 15 dozen eggs are selected for the final test. The reports state the number of eggs falling in each of four groups. These groups are as follows:

1. Extra large (28 ounces or more per dozen).
2. Grade A, large (26 ounces).
3. Grade B, (inferior in quality).
4. Grade C, (cracked or dirty).

Regardless of what may have been done in the way of testing the accuracy of this method of sampling, it serves as a basis for indicating how such a method may be compared with one or more other methods to

No B.O. with KANRY-TEX!

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Does not impart odor or taste.
Resists moisture — alkali — fats — oils.
Easily washable with hot water, live steam, or sterilizing agents.
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see which gives the most reliable sample.

Suppose, for example, that a study of sampling eggs is desirable, the following selections might be made:

1. The method indicated above.
2. The selection of nine cases at random positions in the car, 10 dozen eggs being tested from each case.
3. Selection by a fixed pattern within the car; for instance, one case from each 8-ft. section of a 40-ft. car, 18 dozen eggs being tested from each case.

Statistical methods are applicable for testing the probability of any one of these methods as providing results accurate within some limit—say 2 percent.

This article does not tell the reader how to make a set of statistical calculations. It is not intended to do this. Other articles will follow that will indicate more specifically some of the ways in which the findings of statistical science might profitably be employed in various food industries.

The statistician is one with training comparable in technicality with that of an engineer. His job might well be the improvement of sampling practices in a particular line of production or marketing.

Selected Books

Statistical Methods for Research Workers, R. A. Fisher, Oliver and Boyd, London.

Methods of Statistical Analysis, C. H. Goulden, Burgess Publishing Co., Minneapolis, Minn.

Statistical Technique in Agricultural Research, D. D. Patterson, McGraw-Hill Book Co., New York.

Statistical Methods, George W. Snedecor, Iowa State College Press, Ames, Iowa.

—End—

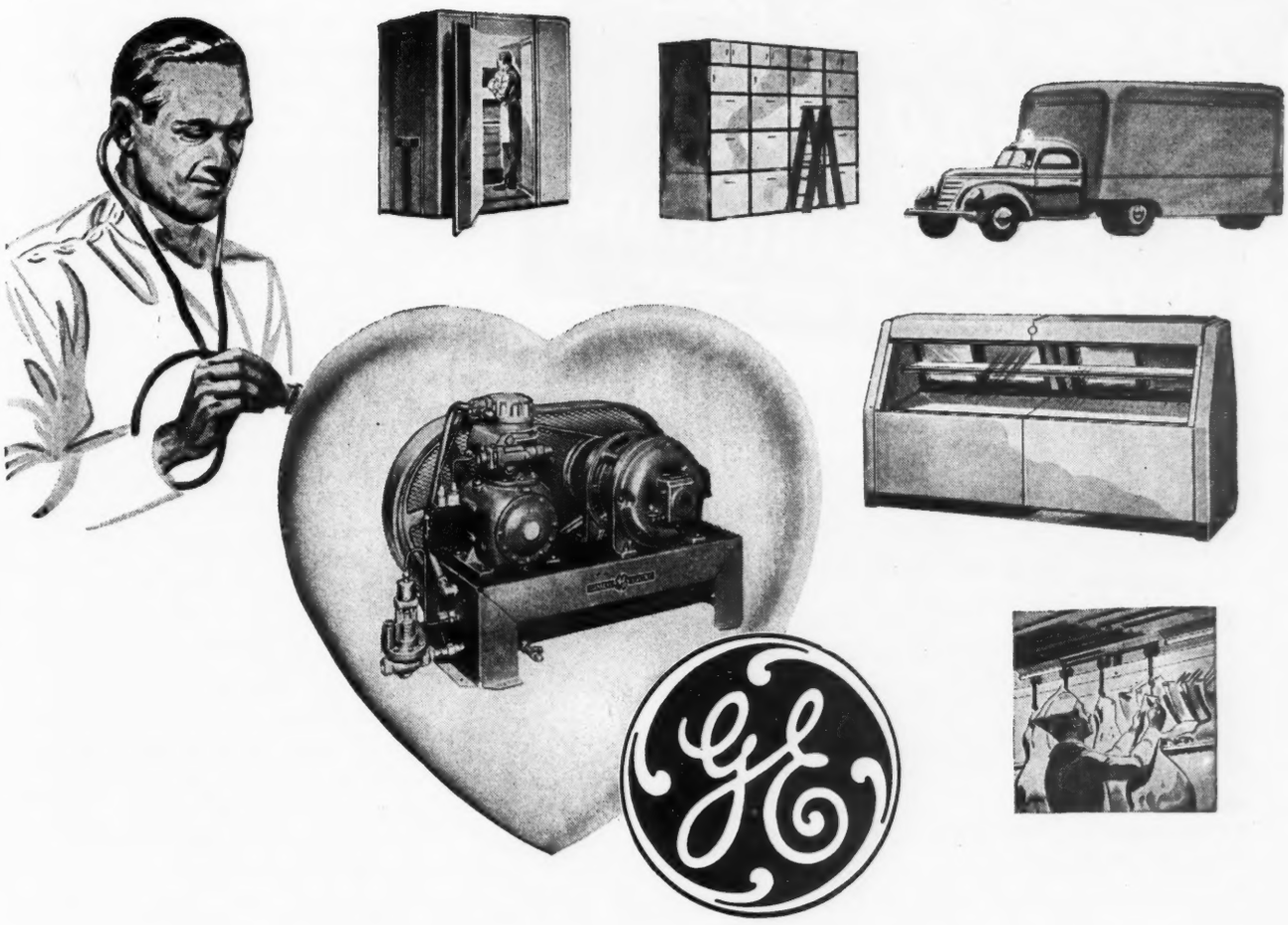
Butter Making

(*Continued from page* 77)

of the emulsion is reversed to one of water-in-fat. As the resulting butter is entirely too viscous to flow at this temperature, it is heated by water in the top cylinder to about 57 deg. F. and flows directly into parchment-lined wooden boxes, which are sealed and placed in cold storage. The water content of the butter is regulated by the pressure screw *C.* This reacts back upon the cream side of the second separator changing the rate of flow and the fat content.

Cream-like When Fresh

As it comes from the machine, the butter resembles a homogeneous thick cream with a clean, fresh, al-



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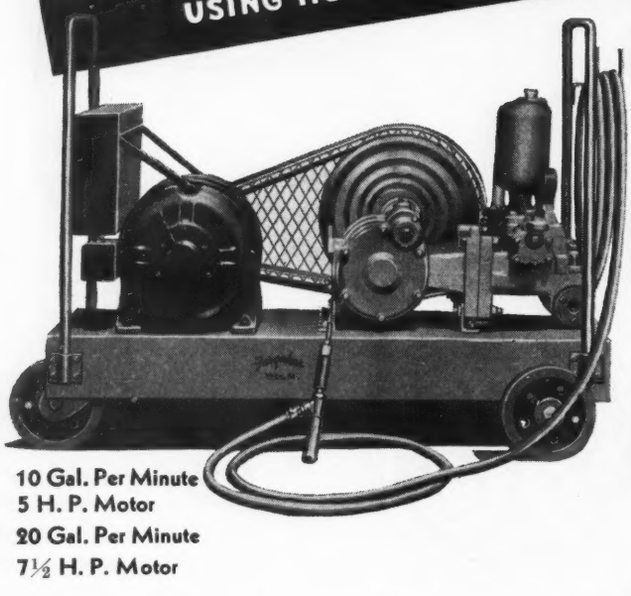

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Thousands of these hi-pressure pumps have been built by Farquhar and have proven efficient over years of operation. This cleaning unit will eliminate much tedious hand work without damage to delicate equipment. Operation is extremely simple; the high velocity jet can be directed to clean quickly large surfaces as well as out-of-the-way areas.

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though cooked, flavor. This cooked flavor disappears after a few weeks in storage, when the product assumes the appearance of a normal fine-grained butter, with no visible signs of free moisture. The composition of the butter, now being made in Germany, is 78 percent fat, 20 percent moisture and 2.0 percent solids-not-fat. According to Professor Möhr, a moisture content as low as 8 percent can be achieved in the butter made by this process. For practical purposes, however, 12 percent moisture should be regarded as a working minimum.

The Alfa machine has been built in one size only, with a capacity of 550 lb. of butter per hour. Equipment for the complete process requires more floor space per pound of capacity than is needed for the Fritz process, and the investment is about seven times as great. The Alfa process, however, appears to be gaining favor in Germany, due to the superior keeping quality of the butter produced, which is attributed to the uniform nature of the emulsion and to the lack of contamination from wash water and air.

Sweet and Sour Cream

Both processes were developed for the manufacture of unsalted, sweet cream butter with a moisture content of 20 percent. In order to make a product that would comply with American legal standards for butterfat content, and contain salt and color, certain modifications in the operation of each process would be necessary. Both Prof. Möhr and Dr. Fritz have stated that they can make butter with a fat content which is higher than is required in this country.

It is said that no changes are needed for churning sour cream by the Fritz process. With the Alfa process, however, modifications are needed. After highly acid cream has been neutralized, there is a tendency for casein to precipitate during the second separation, thus clogging the separator. Separating at 110 deg. F. is said to prevent the precipitation of casein.

—End—

Using DDT

(*Continued from page* 97)

lution of DDT. If they are kept clean and properly treated, a marked reduction in flies, roaches, and other pests can be accomplished.

Space spraying with an aerosol bomb might be an effective method of reducing the numbers of flies that daily invade such places but to be

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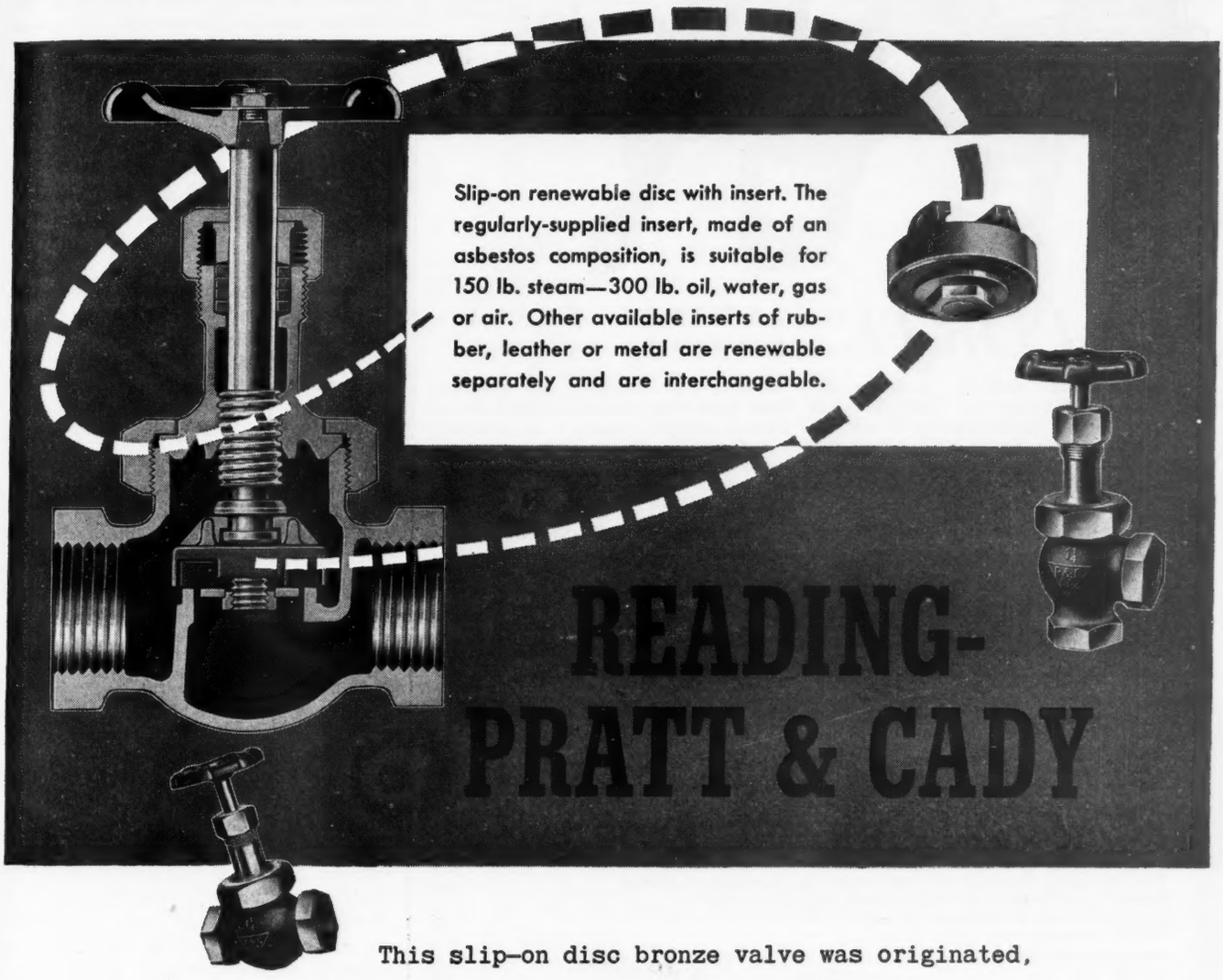
Slip-on renewable disc with insert. The regularly-supplied insert, made of an asbestos composition, is suitable for 150 lb. steam—300 lb. oil, water, gas or air. Other available inserts of rubber, leather or metal are renewable separately and are interchangeable.
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This slip–on disc bronze valve was originated, developed and improved by Reading–Pratt & Cady. Essential to fullest performance are disc guides, cast in the bodies and machined, which extend down to the body seats. This is a versatile valve because a soft disc insert gives a tight closure in a globe type valve, basically a throttling type.

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effective it would have to be done daily, and under certain circumstances, oftener.

Warehouses and Storage Rooms: The problem in these places is primarily one of roach control. All walls and ceilings should be given a residual spray treatment. Particular attention should be given to areas around sinks, drains and water pipes. Because roaches will hide between packages and barrels, it is advisable to sprinkle DDT dust around the bases of piles of packaged or barreled goods. If roaches persist, determine their hiding and breeding areas and treat these thoroughly with dust or spray. Offer the insects every opportunity to walk on either a sprayed or dusted surface.

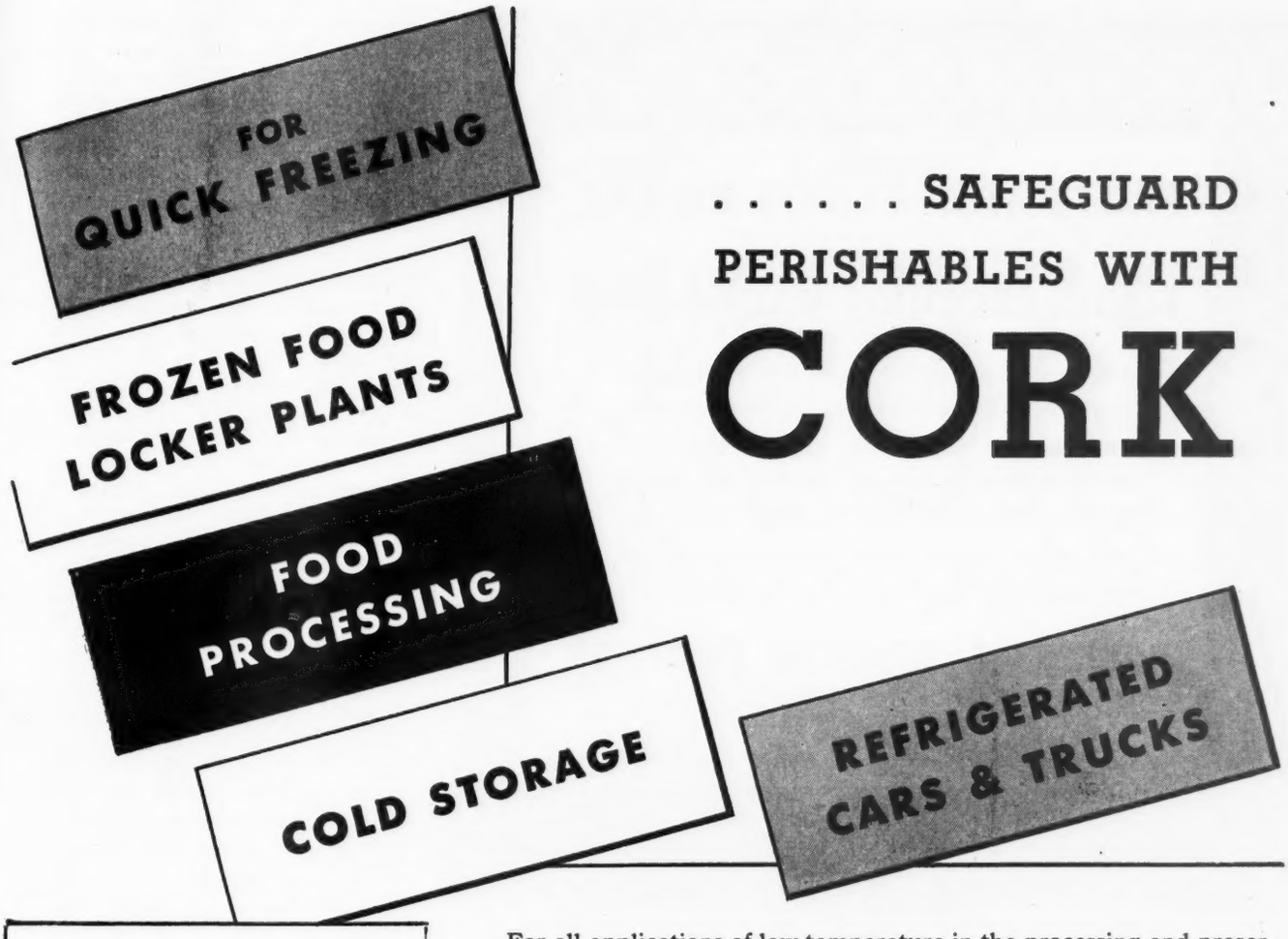
Kitchens and Dining Rooms: Care must be exercised in treating kitchens and dining rooms with DDT to prevent the contamination of food, either directly or via utensils and dishes. Work benches, dining tables and utensils may be protected during spraying by covering them with heavy kraft paper or several thicknesses of newspaper. The finish on furniture and floors will have to be protected from the spray. Plastered or painted walls are usually not injured. If walls or wood work have been painted recently with oil paint, the treatment may have to be repeated several times until the paint has become thoroughly dry. This may require several months.

Residual sprays should be applied to walls, ceilings, doors to outside entrances and window screens. DDT dust should be used only where food cannot be contaminated by it. It is well to restrict the dust to exposed surfaces since food may be stored in direct contact with DDT if it is spread inside cupboards and lockers. Space spraying, using the hand spray gun, should be done daily during the fly season.

Storage of DDT

DDT is stable under ordinary conditions and no special precautions are required for its storage. The commercial powder is usually shipped in fiber containers. These should be clearly labeled and stored where the insecticide cannot be mixed with or mistaken for food.

Solutions are usually made with kerosene or other oils, or with organic solvents. These materials are inflammable and must be kept away from open flames or too high temperatures. A fire extinguisher should be kept in the room used for storage of DDT solutions. Since some of the solvents are volatile, they not only must be kept properly stoppered but they must not be stored where they



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In addition to its well-known insulating qualities, Mundet Corkboard is structurally strong. Its compressive strength and resiliency make it an excellent construction material. Light-in-weight, it is handled easily during installation; cuts economically, and permits tight-fitting joints that give extra protection to insulated areas.

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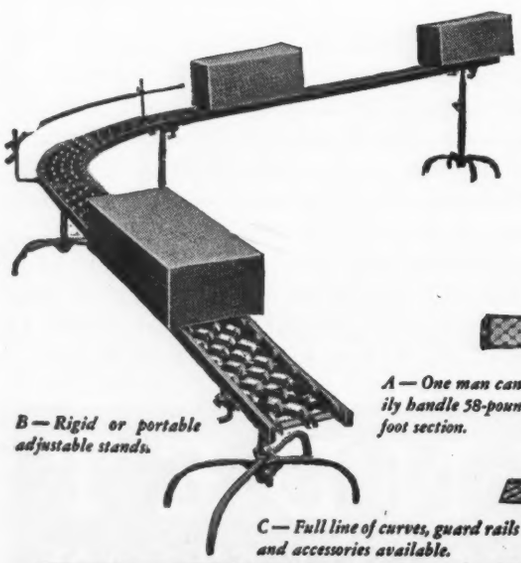

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can alter the flavor or odor of foods.

Spray guns, mixing pails or storage containers should be plainly labeled "DDT ONLY," and should be kept with the spraying materials. Do not use a DDT mixing pail for drinking water or for sprinkling fresh vegetables. The only fluid that should ever be poured through the funnel used for filling spraying equipment is DDT spray solution. A little care in regard to these matters will prevent unnecessary and perhaps costly accidents.

If in the spraying or in preparing mixtures, you spill DDT on your skin, wash it off immediately with soap and water. This is important if you are to avoid DDT dermatitis or other ill effects. Reasonable care should be taken in applying the spray. Bear in mind that it is the surface of the structure which is to be sprayed, not the operator of the spraying equipment.

Conclusion

In this discussion, no mention has been made of the incorporation of DDT in paints, because investigations regarding them are still in progress and no definite recommendations can be made at this time. It appears that paints containing oils may prove to be unsatisfactory for efficient insecticidal activity. Water paints, on the other hand, seem to show considerable promise in this respect. The U.S. Department of Agriculture will probably make definite recommendations regarding DDT paint in the near future.

A new insecticide, benzene hexachloride, or "666," is now under investigation. Because of its musty odor it may prove to be unsatisfactory for use in food plants. If it is later shown to be superior to DDT as far as the insect problems of the food industries are concerned, however, ways may be found to overcome the undesirable odor.

The success in the use of DDT or any other equally good insecticide in the food industries is dependent upon three things: (1) Cleanliness of the plant and its surroundings, (2) the use of the ordinary measures for preventing insect infestation and (3) good judgment in executing the spray program. Under practical conditions it has been demonstrated that fly and roach populations can be reduced 90 to 95 percent, and maintained at the new low level by the combination of these factors. There is no longer any excuse for flies, roaches or other insects in food establishments. DDT offers one more opportunity for the improvement of the food industries.